EDUCATIONAL GUIDANCE AND THE POOL OF ABILITY

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DOUGLAS M. McINTOSH

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From the Foreword by

WILLIAM McCLELLAND

C.B.E., M.A., B.Sc., B.Ed.

author of

Selection for Secondary Education

"In recent years educational guidance has acquired a new interest through its bearing upon one of the most important problems that today face modern societies – that of the pool of ability. Nations who wish to retain their places in the present ruthless world competition in scientific and other fields must make full use of the resources of talent of their citizens; and for this purpose they will have to take steps to ensure that those who have the ability to come into the pool take advantage of the appropriate educational facilities. Dr McIntosh's results are an important contribution to this problem in that they throw light on the potential size of the pool and on ways of increasing the number of entries into it.

I predict with confidence that this account of Dr McIntosh's investigations will be adjudged to be one of the most important contributions to the evolution of a scientifically sound but yet humane system of educational guidance at the end of the primary school course."

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FOREWORD

Dr McIntosh and I collaborated in an investigation on selection for secondary education, carried out in the City of Dundee, and this subject has been one of his main research interests since then. It is one to which he has made many valuable contributions in his books and articles.

One of Dr McIntosh's educational achievements as Director of Education of a large Scottish county has been the building up, through continuous experiment and with the co-operation of his teaching staff, of a system of educational guidance at this important stage in the pupil's educational career. And two of the values of the present volume are that it gives a description of this system and a scientific test of its reliability.

The account of the Fife guidance plans will be of special interest at this time when there is a reaction against the harsh ordeal that the pupil has to face in 'the 11+ examination' on which his future depends. The reader will find that the Fife system of guidance is not a harsh dictatorial one against which many of the current criticisms of promotion systems could fairly be levelled. The wishes of the parents and the aspirations and tastes of the boys and girls are taken into account. Many pupils who, on a rigorous application of the test standards would not be admitted to high school courses, are given their chance if they and their parents so desire: and if, in the end, the tests have proved to be right, the pupil is helped in every possible way to make the necessary changes. Dr McIntosh's present work, in fact, corroborates the view expressed by Professor Truman L Kelley nearly thirty years ago that standardised intelligence and educational tests 'are potent for good if intelligently used by honest, capable and socially minded counsellors'.

In recent years educational guidance has acquired a new interest through its bearing upon one of the most important problems that today face modern societies—that of the pool of ability. Nations who wish to retain their places in the present ruthless world competition in scientific and other fields must make full use of the resources of talent of their citizens; and for this purpose they will have to take steps to ensure that those who have the ability to come into the pool take advantage of the appropriate educational facilities. Dr McIntosh's results are an important contribution to this problem in that they throw light on the potential size of the pool and on ways of increasing the number of entries into it.

I predict with confidence that this account of Dr McIntosh's investigations will be adjudged to be one of the most important contributions to the evolution of a scientifically sound but yet humane system of educational guidance at the end of the primary school course.

WILLIAM MCCLELLAND

EDINBURGH,
June, 1958

PREFACE

McCLELLAND, in his Preface to *Selection for Secondary Education*, stated that the purpose of his investigation was to throw a little light on some of the dark places of the selection problem, that the torch had been a heavy one, and that at the end of the inquiry he willingly handed it on to others. The investigation outlined in this book is an attempt to carry the torch a little further from the place where he laid it down. The burden has become no less heavy and the dark places still abound, but one aspect of the problem has become clear—allocating pupils to secondary courses of instruction is part of the wider and even more important problem of increasing the size of the pool of highly educated manpower.

In 1947 Education Authorities throughout Scotland introduced, at the request of the Scottish Education Department, schemes for allocating pupils to secondary courses of instruction which were largely based on the recommendations made by McClelland. Three years later, however, a fundamental change was made in the conditions of the award of the Senior Leaving Certificate which had been taken by McClelland to be the criterion of the successful completion of a senior secondary course. At the time of his inquiry, the certificate was awarded on a group basis, and each candidate had to pass in at least five subjects at one sitting. Under the new conditions, the certificate was awarded on a subject basis and could be gained by a pupil who passed in one or more subjects. It became essential, therefore, to discover whether this change in the criterion of success altered the findings of the McClelland investigation.

There were several other reasons for undertaking an investigation into the validity of promotion schemes. Owing to war and other conditions, McClelland had to be content with the estimates of headteachers at the end of the third year of the probable success of the pupils two or three years later, and it appeared advisable to conduct an investigation in which the actual results of the Leaving Certificate examinations were available. Again, in the McClelland inquiry an undertaking was given that the experimental data would play no part in the Education Authority's scheme of allocation, and thus a test of the recommended scheme in operation was necessary. Perhaps most important of all was the need for an investigation into the cause of educational wastage from secondary schools. In sharp contrast to the pre-war years, the lack of highly educated man-power in post-war Britain has become a matter of national concern; and there is little evidence on the extent of, and the factors causing educational wastage: this investigation was undertaken to throw some light on this important problem.

An inquiry which involved the study of the primary school records, the secondary school progress, and the after school careers of 4,416 pupils could not have been undertaken by one person alone. Indeed, one of the reasons for carrying out the investigation was to demonstrate how a local research group could function, and an outline of the organisation of the group is given in Appendix I. While the views expressed and the conclusions drawn from the data must be personal, the publication is intended to be a tribute to the Fife teachers without whom it could not have been produced.

It would be difficult to mention all those, in addition to the Fife teaching staff, to whom thanks are due for assisting with the publication of the results of the investigation, but reference must be made to some upon whom I leant heavily. I am deeply indebted to Mr McClelland, whose own work will remain a classical investigation in this field. He gave constant encouragement and advice, helped with the manuscript, and wrote the Foreword: like many others in Scottish education, I owe much to his wise and friendly counsel. My friend and colleague, Dr D A Walker, has made a contribution to this inquiry which only I can appreciate. Whenever a new statistical problem arose, he spared no effort until a solution was found, he appraised the results with a critical eye, and revised the manuscript with a competence which few could match. Mr Grassie, my Assistant, was largely responsible for the administration of the research and organised the work of the Panels; I am very grateful to him for the very many hours of his leisure time which he cheerfully sacrificed in order to ensure that the investigation was efficiently conducted. It cannot be too strongly stressed that this large-scale investigation was carried out after normal working hours: the sacrifice was not merely a personal one but had to be shared by our homes. I am accordingly greatly indebted to my wife who, while expressing complete scepticism about the value of the statistical assessment of human activities, encouraged me both by her forbearance and by the valuable assistance she gave with the organisation of the data and with the statistical calculations. It was inevitable, also, that the office staff should become involved; their part in this inquiry cannot be under-estimated. I must also express my gratitude to Mr H S Foster of the University of London Press for his encouragement and the guidance which he gave with the publication of the report.

In this mid-twentieth century a nation's strength depends to a large extent upon its highly educated manpower. Scotland cannot be accused of neglecting her able children; indeed, the criticism might well be that the normal child was sacrificed in the interests of the 'lad o' pairts'. In our concern with the pool of ability, we must never forget that all children should be given an education which will develop their potential talents no matter how many or how few they possess and which will enable them to live full and happy lives. It is hoped that all our efforts will have made a contribution towards the realisation of this aim.

DOUGLAS M MCINTOSH

KIRKCALDY,
June, 1958

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CHAPTER I

THE INQUIRY

PROMOTION SCHEMES SINCE 1942

THE design of promotion schemes in the various education areas in Scotland has been largely fashioned by the classical investigation of McClelland published in 1942 under the title *Selection for Secondary Education*. As a result of his research, he recommended that special examinations for admission to high schools, generally known as control examinations, be discarded and that one scheme be adopted for the allocation of pupils to all types of secondary courses. He also established that the best method of assessing a child's potential ability was by means of the battery I+Q+Ts where I was the result from an intelligence test, Q was the combined marks from tests in English and arithmetic, and Ts consisted of the teachers' estimates in English and arithmetic which had been scaled—the English estimates scaled on the English test results and the arithmetic estimates scaled on the arithmetic test results. Another important conclusion was that the number of pupils to be admitted to senior secondary courses should be determined by fixing a pass mark at a point which would cut off approximately 25 per cent of a complete promotion group.

In 1946 the educational scene in Scotland was considerably changed, and some of the conditions under which McClelland conducted his inquiry were radically altered. The Education Act of that year made it necessary for Authorities to provide free education for all pupils and to ensure that, wherever practicable, children were to be educated in accordance with the wishes of the parents. Education Authorities were, therefore, compelled to provide, without cost to the parents, senior secondary school courses for all pupils who were judged to be capable of profiting by them and whose parents wished them to follow such courses. The abolition of bursary examinations and of admission to senior secondary schools by payment of fees followed automatically.

The Advisory Council on Education in Scotland issued in 1946 their Report on Primary Education, which included a section dealing with the problem of transfer from primary to secondary courses of instruction. They recommended that in all systems of assessment *two* intelligence tests be used, one preferably to be taken 18 months before the transfer stage, and that there be provision for obtaining the opinion of the primary school teachers about the child's attainments, aptitudes, personal qualities and home conditions. To ensure that standards would be uniform throughout an education area, it was also recommended that standardised attainment tests in English and arithmetic be used or, alternatively, a common examination for the area. The suggested method of assessing a child's capacity was by the battery IQ_1+IQ_2+Q+Ts.

Following the advice of the Advisory Council, the Scottish Education Department issued in July 1947 Circular No. 108 calling upon Education Authorities to submit schemes outlining the proposals for promoting children from primary to secondary Education. Among the important points in the circular were:

(i) the age for promotion should lie between $11\frac{1}{2}$ and $12\frac{1}{2}$ years;
(ii) promotion to secondary courses more than once in each year should be seriously considered by all Education Authorities;
(iii) all promotion schemes must contain adequate provision for consultation with parents;
(iv) since no system of selection is completely reliable, arrangements should be made in each scheme for the reconsideration of the original allocation which should be regarded as provisional.

The recommended method of assessment was to include (*a*) teachers' scaled estimates in English and arithmetic, (*b*) two intelligence tests, one to be given in Primary VI and the other shortly before the end of the primary course, (*c*) attainment tests or examinations. Where short answer tests were to be used, they were always to be supplemented by some form of test in English composition, the marking of which would require to be carefully standardised.

One other major change in the Scottish educational scene was the decision intimated in Circular 145 by the Scottish Education Department in January 1949 to alter the nature of the Leaving Certificate. Again following the advice of the Advisory Council, the Secretary of State decided that the Senior Leaving Certificate was to become the Scottish Leaving Certificate, and that from 1950 it was to be awarded on a subject basis instead of a group basis. Although it was to be no longer a test of the successful completion of an approved course as a whole, candidates were to be required to follow an approved five-year course of secondary education. McClelland's criterion of success, it should be recalled, was the award of the Senior Leaving Certificate, in which a pupil was required to gain at one sitting two subjects on the higher standard, one of which must be English, and three subjects on the lower standard.

Any follow-up investigation initiated in 1951 which followed the McClelland pattern was therefore influenced by two new factors. First, the certificate which McClelland took as his final criterion of success had changed fundamentally in character; and, secondly, education was free, whereas the senior secondary schools in Dundee at the time of the McClelland investigation were fee-paying.

AIM OF THE INQUIRY

The main purpose of this investigation was to test the efficiency with which pupils are allocated to the appropriate secondary courses of instruction using the system recommended by McClelland and advocated by the Advisory Council on Education in Scotland.

There are, however, several fundamental differences between this inquiry and that carried out by McClelland.

1. The McClelland investigation followed the careers of the pupils only to the end of the third year in the secondary schools. In this inquiry it was possible to record the complete

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educational history of each pupil during his secondary school career.

2. In this inquiry the results of an actual promotion scheme were used, whereas the McClelland data were experimental in character and did not affect a pupil's future.

3. The areas in which the respective inquiries were conducted differ considerably. In Dundee all the schools were urban in character, whereas in Fife there is a wide variety of types ranging from the single teacher country school to the large urban school.

In addition, there are the two factors mentioned in the previous section.

4. At the time of the McClelland inquiry the senior secondary schools in Dundee were fee-paying. In Fife, high school education is completely free, but no child is admitted unless he is judged capable of profiting from it.

5. The Leaving Certificate, the ultimate criterion of success in both investigations, was awarded on a group basis at the time of the McClelland inquiry, but on an individual subject basis when the Fife investigation was undertaken.

The scope of this inquiry was extended in several ways, and an endeavour was made to throw further light on some of the educational problems of the present time. For example, by finding the extent to which able pupils left school before completing their high school courses, it was possible to examine the problem of early leaving and to estimate the size of the pool of ability. The Youth Employment Service, also, followed up each child into his first employment, thus providing data for the study of wastage and other allied manpower problems.

DESIGN OF THE INVESTIGATION

In order to compare promotion data with progress in secondary school in a follow-up inquiry of the scope and nature of the present one, it was essential to have an individual record for each child.

A profile card, P.C. 1 (see page 27), was therefore drawn up on the lines recommended by McClelland and was used to cover the first three years of a pupil's secondary course. The front of the card contained the complete promotion data; the back of the card gave the secondary school record, which included class marks, headteacher's estimate of the suitability of the course which the pupil followed, and other relevant information.

Since P.C. 1 covered only the first three years of the secondary courses, a second profile card, P.C. 2 (see page 28), was designed. On the front of this card was recorded the promotion data, the Scottish Leaving Certificate results, and details of the career chosen on leaving school; on the back of the card was recorded the terminal examination marks, estimates of probable success in Leaving Certificate examinations made at the end of the fourth year and during the fifth year of the course, and the actual results of the Scottish Leaving Certificate examinations.

When a pupil left school on or after the statutory school leaving age, his profile card was sent to the Youth Employment Officer, who gave details of the employment or full-time course of further education upon which the pupil had entered.

Some further administrative details of the investigation are given in Appendix II.

THE FIFE SCHEME OF PROMOTION

The scheme is administered by a Transfer Board composed of representatives of the Education Committee, teachers and the Director of Education.

The quantitative method of assessing pupils' ability and attainment is by the battery:

$$IQ_1+IQ_2+Qe+Qa+Tes+Tas \rightarrow AA$$

where IQ_1 and IQ_2 are derived from intelligence tests set at yearly intervals; Qe and Qa are marks derived from specially constructed tests in English and arithmetic; Tes is the teacher's estimate in English scaled on the English test results, and Tas is the estimate in arithmetic scaled on the arithmetic test results. AA is a summary mark obtained by combining the six measures, and is termed the adjusted average.

A test in English composition is set. Teachers are supplied with a scheme of marking in order that the marks may be reasonably comparable from school to school. Since the reliability of any system of marking composition is not high, these marks from the composition are used only in the consideration of borderline cases.

It is recognised that there are other factors which may affect a pupil's suitability for a particular secondary course, but these cannot be accurately assessed in an objective manner. Such factors include special aptitudes, home circumstances, health and temperament. Headteachers are requested to give full information about any such factors in exceptional cases. They must also draw attention to, and if possible offer explanations of, any apparent discrepancies in the test results.

Headteachers also submit a recommendation on the type of secondary course for which they consider each pupil is best fitted.

The parents of all children being considered for transfer are given a circular explaining the nature of the various secondary courses, and are invited to consult the headteacher before making the final choice of a course for their child. They are required to return a signed statement indicating the course to which they wish their child allocated. Where this choice is quite at variance with the pupil's ability and attainment, and the parents have not consulted the headteacher, he is expected to interview and explain the position fully to them.

On all the evidence submitted to them and taking into account the wishes of the parents, the Transfer Board allocate the pupils to what they consider to be the most appropriate secondary courses. The parent or the headteacher is given an opportunity of appealing against the Board's decision, and further consideration is given to each case provided fresh evidence is produced supporting the claim.

At the time when this investigation was undertaken, the Board had adopted a policy of reviewing the cases of very able children whose parents had not chosen senior secondary school courses. Headteachers were asked to interview the parents again, and in several instances they were persuaded to allow their children to enrol in a senior secondary course.

Pupils are transferred from primary to secondary courses in September and in February. Since senior secondary courses begin only in September, pupils who are allocated to such courses in February are accommodated in preparatory classes.

In these classes instruction is given in secondary school subjects, but pupils commence their senior secondary courses proper six months later.

It is recognised that any system of allocation cannot be completely valid, and therefore headteachers of secondary schools are asked to draw attention to the case of a pupil who has been wrongly allocated as soon as this becomes apparent. They are asked particularly to encourage pupils to transfer to more difficult courses.

SECONDARY COURSES

There is no statutory sanction for the term 'junior secondary school'. It has been generally adopted, however, in Scotland, and is used by the Scottish Education Department officially in their reports, but there is a feeling in some areas that the use of the term 'junior' detracts from the status and prestige of such schools. Fife Education Committee have dropped the word 'junior' and refer to these schools simply as 'secondary schools' and use the term 'high schools' to denote schools in which there are courses leading to the award of the Scottish Leaving Certificate. The term 'junior secondary' is used, however, throughout the report in order to avoid confusion to those who use the term 'secondary' to cover all forms of post-primary education in day school.

In Fife there were eight high schools, which differed considerably in the types of courses they provided. One, for example, had only courses which led to the Scottish Leaving Certificate, a second enrolled all the post-primary pupils from a defined area, while a third had no girls following junior secondary courses.

There were 38 schools with junior secondary departments, which varied in character and had, at the time of the inquiry, rolls ranging from 29 to 908.

If a school is to provide a secondary education to suit the age, ability and aptitude of all its pupils, it must provide a wide variety of courses. It is natural also that courses should vary in character from school to school, and it is therefore difficult to classify them in broad general terms because, even where the courses are similarly named, the curriculum may vary in detail. In a three year commercial course, for example, some schools include a modern language such as French. Even here, however, there is variation, for in some schools the language is taught as a Leaving Certificate subject along the usual academic lines, and in others it is limited to a few periods per week and is taught by the direct method. For the purposes of this investigation, however, some broad classification of secondary courses was necessary.

There were four main types of course, each of which may be further subdivided. They were:

1. A courses—5 or 6 year courses in high schools leading to the award of the Scottish Leaving Certificate. These may be further subdivided into:
    - (*a*) Two-language courses which included Latin and a modern language, normally French or German.
    - (*b*) One-language courses which included French or German with the boys receiving instruction in technical subjects and the girls domestic subjects.

2. A2 (Com.) courses—3 year commercial courses
    - (*a*) in high schools
        - (i) with French or German
        - (ii) without a language
    - (*b*) in junior secondary schools
        - (i) with French
        - (ii) without a language.

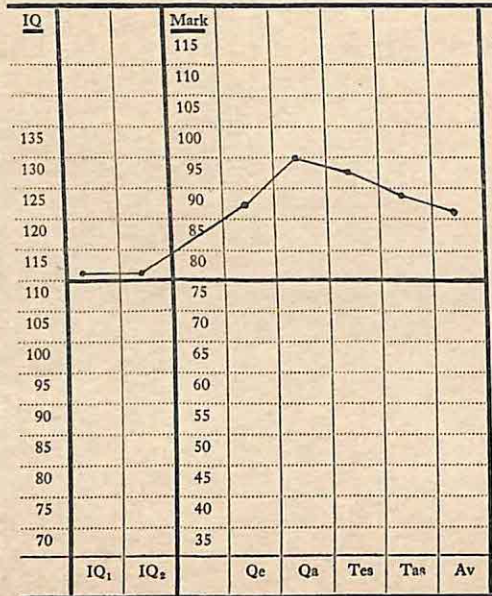
3. B1 courses—3 year courses with about 20 per cent of the time allocated to technical subjects for boys and domestic subjects for girls.

4. B2 courses—3 year courses similar to B1 courses but with a more practical bias, *e.g.* mathematics largely replaced by practical arithmetic.

PROFILE CARD PC 1

Name SMITH., JOAN
Number 830
Date of Birth 7:12:38
Date of Entry to Secondary School 1:2:52
Primary School 95
Secondary School 94

PROFILE



Place in family:-2/2

Father dead.

Parental attitude :- Wished girl to remain at school.

Pupil's attitude :- Did not see any reason for staying on at school.

Rector's report :- Good girl, but money required at home

IQ_1	111
IQ_2	111
Qe	87
Qa	95
Tes	93
Tas	89
AA	86
Course suggested by Battery	A
" " Parent	A
" " Teacher	A
Decision of Board	A
Appeal	
Remarks	

PUPIL 830.—This pupil was an able leaver (see Chapter VII), she left school at the end of the third year and, in the opinion of the Rector, would probably have gained a Leaving Certificate if she had remained at school.

PROFILE CARD PC 2

Name BROWN, JOHN

Number 722

Date of Birth 17:8:39

Primary School 76

Secondary School 75

Date of entry to Secondary School 27:8:52

Date of leaving Secondary School 5:7:57

PROMOTION BATTERY

IQ₁ 119

IQ₂ 117

Qe 95

Qa 79

Tes 85

Tas 82

Total/Adj.Ave. 577/85

Parent A

Teacher A

Board A

Appeal

Remarks

SECONDARY SCHOOL REMARKS

Fourth Year:—

Fifth Year:—

Sixth Year:— Had a good sixth year because of occupational interest.

Is pupil proceeding to a full-time course of further education? Yes.

If so, state: (i) Institution Central Institution

(ii) Course B.Sc.

(iii) Proposed career

(iv) Estimate of success

S.L.C./UNI. PRELIM. RESULTS

SUBJECT	1955 H	1955 L	1956 H	1956 L	1957 H	1957 L
Engl.			1			
Hist.						
Geog.				2		
Fr.				2		
Ger.						
Lat.						
Grk.						
Maths.				2	1	
Phys.			1			
Chem.						
Zoo.						
Bot.						
Engr.						
Dyn.						
Art						
Mus.						
Tech.				2	1	
Dom.						
Comm.						
Anal.						
Geom.						
Arith.				×		

TOTAL

	Highers	Lowers
1955		
1956	2	4
1957	2	
Pts.	8	⑩

University Entrance Group obtained

in (year) 1957

Y. E. S.

Career Entered

Occupational Classification

I II III IV V

Details of part-time education if any.

Institution

Course

PUPIL 722.—This pupil gained a Leaving Certificate with two passes on the higher standard and four on the lower, and a pass in Arithmetic after five years in a high school. In the sixth year he passed in Higher Mathematics, thus gaining a University Entrance qualification, and also in Higher Technical subjects.

CHAPTER II

THE PROMOTION GROUP

THE SIZE OF THE PROMOTION GROUP

THE promotion group consisted of all pupils who were considered for transfer to post-primary courses during session 1950–51.

As the allocation of pupils to post-primary courses in Fife is made twice a year, in February and in September, the promotion group was made up of two sub-groups referred to throughout the report as the February group and the September group.

Group	*Boys*	*Girls*	*Total*
February	847	914	1,761
September	1,291	1,364	2,655
Promotion	2,138	2,278	4,416

McClelland stated that the tracing of the 3,229 pupils in his inquiry proved to be 'an intricate task'. Those who have helped with any large scale follow-up investigation know to their cost that an educational system which attempts to meet the widely varying needs of a complete age group of children has little regard for the requirements of the investigator, restricted as he is in the treatment of his data by the rigid statistical laws governing educational measurement. One of the features of this inquiry was the insight it gave into the way in which a large group of children collected together at one point in the educational stream become separated; most proceed with the main flow of the current, some dally by the banks making their way leisurely downstream, others spend their educational lives in placid backwaters; and, to the annoyance of the investigator, not a few disappear, seeping away from the stream and thus become lost to the inquiry. There would be something fundamentally unsound in a system of education where the progress of children could be charted with the mathematical exactness which delights the statistician's heart, but the tracing of 4,416 pupils throughout the whole of their post-primary careers and then into employment proved to be a venture of unimagined and, at times, frustrating complexity.

Age of Promotion Group

In England the average age of transfer is approximately 11 years, and was the subject of a recommendation by the Hadow Committee which suggested that primary education should be regarded as ending about the age of 11+. The average age at which children are transferred to post-primary courses in Scotland is about 12 years: this age appears to have been determined empirically.

Thanks to a better understanding of child development, one major change has occurred in practice in allocating pupils to post-primary courses. No longer is it regarded as necessary to have at the end of the primary school a hurdle which must be cleared if a child is to enjoy the benefits of a post-primary education: each child now has a right to this irrespective of his native ability. Accordingly, pupils are allocated to the post-primary courses deemed to be appropriate to their ability and aptitude at a particular age rather than when they have achieved certain pre-determined educational standards. Two types of child have profited by this procedure. First, those of low intelligence who were quite incapable of passing the 'qualifying examination' and who consequently spent the remainder of their educational life 'in shallows and in miseries'. Secondly, those of very high intelligence who were capable of clearing the hurdle at an early age and were made to do so, and who found themselves at a later date in courses of study for which they lacked the necessary maturity.

Some education authorities introduced what is known as the 'clean cut' in order to ensure the transfer of all pupils to post-primary courses at an appropriate age. In the Fife promotion scheme the 'clean cut' system is operated by a regulation whereby no child is retained in the primary school beyond the age of 12 years and 4 months, and no child is presented for transfer who has not attained the age of 11 years unless special circumstances can be pleaded.

The age at which a pupil is transferred naturally determines the length of post-primary education which the child receives before reaching the statutory school leaving age; for example, a child transferred at 12 years 6 months will receive approximately only 2½ years post-primary education before he is entitled to leave school. Where the 'clean cut' system is not in operation, therefore, a large proportion of the pupils generally receive less than three years post-primary education.

The average age of the promotion groups was as follows:

Group	*Average Age*
February	11 years 10½ months
September	11 years 11 months
Promotion	11 years 11 months

The distribution of the ages shows that 82 per cent of the promotion group were transferred to post-primary courses between the ages of 11 years 9 months and 12 years 3 months. Of the 18 per cent outwith this age range, only 2·2 per cent were above 12 years 3 months, and the bulk of those below 11 years 9 months lay within the age range 11 years 6 months to 11 years 8 months.

The youngest pupil to be promoted was 10 years 7 months old, and was granted permission to transfer after a special appeal by parents and headteacher. She was an exceptionally able pupil with an IQ of 138+ by the group tests and 168 on the Terman-Merrill scale. After six years in a high school, she gained passes in the Leaving Certificate Examination on the higher standard in six subjects—English, history, Latin, French Greek and mathematics. Not only did she do well in her studies, but also took an active part in extra-curricular activities. The Rector of the high school which she attended held the view that a correct decision had been made in allowing her to proceed to a high school course, but that she should have remained at school for a seventh year before embarking on a university course.

There is a case for allowing a young pupil of exceptional ability to proceed to a high school course where his talents will be exercised to the full provided there are good grounds for anticipating that his physical and emotional development will not be disturbed by the regular association with more mature but no more able children.

Illness or residence abroad is generally the cause of pupils transferring to post-primary courses much beyond the age of 12 years 3 months. Seldom do such pupils remain at school beyond the statutory school leaving age and thus they receive only two years post-primary education. One of the oldest pupils to be transferred was aged 13 years 1 month. She had been absent ill for 1½ years and was re-admitted to school two months prior to the transfer date. A normal B1 pupil of IQ 104, she attended a secondary school for two years and left to become a shorthand typist in a solicitor's office.

Age Allowance

The majority of education authorities in England make an allowance for difference of age between pupils who are being considered for admission to grammar schools. The normal practice is to award a bonus number of marks for each month below a specific age.

McClelland recommended that no age allowance be used in promotion schemes in Scotland. His inquiry showed that the number of misfits increased when an age allowance was introduced, and also that there was a negative correlation between age and the promotion battery. Prediction thus became less accurate, and the calculation of an appropriate age allowance presented a difficult problem.

Professor Godfrey H Thomson, in a note in which he disagreed with McClelland's finding, stated that the object of an age allowance is not to improve prediction but to do justice to children born in different months of the year. In the report published by the National Foundation for Educational Research, *Admission to Grammar Schools*, it is agreed that the predictive value of a test battery is generally lowered by the introduction of an age allowance, but the omission of an age allowance results in a maldistribution of awards throughout the age group. A greater proportion of the awards go to the older pupils, and the young child is therefore at a disadvantage.

In the Fife promotion scheme there is no age allowance. Further, a six-monthly group is presented for promotion twice a year, and this, to some extent, weakens the case for an age allowance.

The results of this inquiry confirm the finding of the Dundee investigation that there is a negative correlation between age and the promotion battery. In order to discover whether an injustice had been done to the younger child, an analysis of the allocation to 'A' courses for the different monthly age groups was made and is shown in Table I.

TABLE I

DISTRIBUTION OF 'A' COURSES ACCORDING TO AGE

Age Group	Percentage of Age Group in 'A' Courses
11^9	30·0
11^{10}	22·9
11^{11}	22·1
12^0	22·3
12^1	22·9
12^2	21·4
12^3	22·9

It is clear from Table I that no injustice is being done to the young child by omitting an age allowance in the promotion scheme.

THE TEST BATTERY

1. *The Intelligence Tests*

The intelligence tests used in the Fife promotion arrangements at the time of the inquiry were Moray House tests and were set in October of each year. They were given to all pupils in the 10–12 age groups and to all pupils outwith this group in classes Primary VI and Primary VII. By this system all pupils sat two tests with a year between each; the result of the first test is denoted by IQ_1 and that of the second by IQ_2. Where the two IQs of a pupil differed by 10 or more points, the headteacher was expected to ask for a third test or to request the services of the County Psychologist in order to determine with greater accuracy the intelligence level of the pupil concerned. The tests were standardised on the Fife age groups with a mean IQ of 100 and a standard deviation of 15.

The mean IQ and the standard deviation of the promotion group on the two tests were as follows:

	Mean	*Standard Deviation*
IQ_1	100·25	14·27
IQ_2	101·07	15·26

The differences are not significant, and it may be concluded that the promotion group consists of a number of children whose IQs are normally distributed about a mean IQ of 100 and a standard deviation of 15.

The correlations between IQ_1 and IQ_2 for the February and September groups were 0·915 and 0·902 respectively. These coefficients, though high, will permit a fair amount of disagreement between the two sets of IQs. The insistence upon a third test or an individual test by a trained psychologist where there is a difference of 10 or more points of IQ, or where the teacher is not satisfied that the tests are giving an accurate assessment of the child's ability, ensures that there is little likelihood that an injustice was done to any child.

2. *Tests in English and Arithmetic*

These tests were constructed by two specially trained research groups of teachers representative of both primary and post-primary schools. They were, in the main, objective in character, although the English test was not of the single word answer type; they approached more nearly McClelland's 'qualifying examinations' than the Moray House tests in English and arithmetic which were used in his inquiry.*

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* Examples of these tests are given in *Lomond English* Book 5 and *Lomond Arithmetic* Book 5, University of London Press Ltd.

The tests were set on successive days to the February group in November and to the September group in May.

The English test consisted of two sections, Language Usage and Interpretation, the time allocation for the sections being 25 minutes and 45 minutes respectively. Similarly, the arithmetic test consisted of two sections one dealing with mechanical and the other with problem arithmetic; the time allocations were 35 minutes and 45 minutes respectively; both sections had questions which might be considered in the long sums category.

The raw test scores were 'standardised', *i.e.* they were made to form a normal distribution with a mean score of 65 and a standard deviation of 15 and thus to correspond to the scatter of the IQs.

3. *Teachers' Estimates*

Numerical estimates in English and arithmetic were submitted by the teachers and were intended to be measures of attainment in each subject in all its aspects and were not meant to be forecasts of the mark likely to be gained in the objective tests. Headteachers were expected, in submitting their numerical estimates, to distinguish between pupils. If several pupils from a school are placed on the same mark, the teacher has in fact relinquished her proper place in the allocation of these pupils and has left the decision to the tests.

Teachers were asked to provide estimates on a scale with a County mean of 65 and standard deviation 15; the estimates ranged, therefore, from 30 to 100. With such a scale an estimate of 65 should be given to a child whose attainments are average where the whole County is considered; an estimate of 75 indicates an attainment just sufficient to warrant admission to a high school course; 55 is the level of attainment for pupils being admitted to a 3 years technical course.

Except in the schools presenting only a few candidates, the teachers' estimates of attainment were scaled on the 'standardised' scores. The effect of the scaling in each subject is to give the scaled estimates the same average and scatter as those of the marks obtained by the pupils of that school in that subject. The order of merit proposed by the teacher in that subject is not altered by the scaling process.

That the scaling process achieved its objective in distributing the teachers' estimates in the desired way is shown by the means and standard deviations for the promotion group as a whole.

	Mean	*Standard Deviation*
Tes	65·34	15·22
Tas	65·51	15·23

Teachers' estimates are dealt with more fully in Chapter V.

4. *The Adjusted Average*

This figure is obtained by finding the total of the two IQs, the two standardised marks and the scaled estimates, subtracting 70 and dividing by 6. The subtraction of 70 is made to reduce the IQs, which have a County average of 100, to the same level as standardised marks and scaled estimates which have averages of 65. Since all six measures have in effect the same mean and standard deviation and are normally distributed, the distribution of the adjusted average corresponds closely to that of each of the measures, *i.e.* it is a normal distribution with a mean of 65 and a standard deviation of somewhat less than 15. The mean adjusted average for the promotion group was 65·39 and the standard deviation was 14·21. The size of the standard deviation may be explained by the fact that when a number of measures are averaged the standard deviation of the average is generally less than the average of the standard deviations of the individual measures.

ENGLISH COMPOSITION

The composition was set at a time convenient to the school during the week prior to the attainment tests and was given as part of the normal work of the class. The pupils were not made aware that the composition was a test for the purposes of transfer. Pupils were given five subjects to choose from and 45 minutes were allowed for writing the composition.

The following marking system was used:

(*a*) Sense and substance (ideas and logical arrangement of)	10 marks
(*b*) Vocabulary and idiom (extent and choice of)	5 marks
(*c*) Sentence structure (introductions, linkages, style, etc.)	5 marks
(*d*) Punctuation, spelling, grammar, etc.	5 marks
(*e*) General impression	5 marks
Total	30 marks

As was indicated in the previous chapter, the mark awarded to the composition was not included in the test battery but was taken into account in the consideration of border zone cases.

Special Consideration

Headteachers were expected to draw attention to any special abilities or disabilities of a pupil which might be deciding factors in determining a pupil's post-primary course. Similarly, attention had to be drawn to apparent discrepancies in the promotion data and reasons suggested for such anomalies.

Typical of the entries under this heading were: (i) 'Began learning English three years ago. Previously spoke Arabic. Awaiting non-verbal test from County Psychologist'; (ii) 'Careful and accurate, but slow owing to defective eyesight'.

The Wishes of the Parents

The signed declaration from the parents indicated the preference for an A, A2(Com.), B1 or B2 course. No attempt was made to allocate pupils to one-language or two-language courses as it was deemed that this was a matter best dealt with by the Rectors of the high schools in consultation with the parents. Rectors, who were given full powers to allocate pupils to the different high school courses, were guided by the test battery in making their allocation.

It was made clear to parents that the decision of the Transfer Board did not determine a child's post-primary course for all time. Reconsideration might be given at any time, and headteachers of post-primary schools might, on submission of the pupil's record, recommend a transfer from one course to another; these recommendations were generally accepted and the pupils transferred without further examination.

Parents were given an opportunity of appealing against the decision of the Transfer Board. The headteachers of the primary schools were consulted, and if they supported the appeal, were asked to produce further evidence in support of the claim.

If the Transfer Board rejected the parent's appeal, he had the right to appeal to the Secretary of State for Scotland. No such appeal was made on behalf of any pupil in the promotion group.

Headteachers' Recommendations

Headteachers of primary schools made specific recommendations of the course, A, A2(Com.), B1 or B2, to which they thought each pupil should be allocated.

Method of Allocation

Two 'pass marks' were in operation. First, that which had to be attained by pupils wishing admission to A and A2(Com.) courses and, as recommended by McClelland, fixed at a point which was $\cdot 7\sigma$ above the mean of the adjusted averages. This mark admits approximately 25 per cent of an age group to these courses. Secondly, that which had to be attained by pupils wishing admission to B1 courses and was fixed at $\cdot 7\sigma$ below the mean of the adjusted averages.

The Transfer Board's final decision was indicated by A1, A2(Com.), B1, B2 or Retain. The latter category was used mainly for those pupils who, with a further period in the primary school, might attain the pass mark for a course for which he did not appear to be fitted at that time; an obvious case would be the child who had been absent from school for a period and who had fallen a little short of the attainment necessary for a high school course but whose intelligence appeared to warrant his transfer to such a course.

The Allocation

After full consideration of borderline cases and appeals, the Board's final allocation of the promotion group was as follows:

	Course				
Group	A	B1	B2	Retain	Total
February	454	860	434	13	1,761
September	774	1,270	593	18	2,655
Promotion	1,228	2,130	1,027	31	4,416
Percentage of Promotion Group	28	48	23	1	100

The total number of 'A' pupils was 1,228 which is 28 per cent of the promotion group. This percentage is higher than that cut off by the pass mark of 75 and indicates the lenient attitude taken by the Board with regard to appeals and borderline cases. The Board was particularly generous in dealing with appeals for the 3 years commercial course, in which success may be achieved by those pupils with less ability than is necessary for the full Leaving Certificate courses. The percentages of approximately 48 and 23 for the B1 and B2 groups also show the tendency to give the pupils the benefit of the doubt when the allocation is being made.

CHAPTER III

THE PREDICTIVE VALUE OF THE TEST BATTERY

SUCCESS IN SECONDARY EDUCATION

IN many experimental investigations in the field of education there is a point at which the investigator can no longer rely upon scientific principles, but must look to his philosophy. In the attempt to find the prognostic value of a promotion battery such a point is reached when the criterion of success has to be determined. A pupil's success in education depends upon what the school is trying to achieve: and the aim of education is a matter for the philosopher.

Secondary education is described in the Education Act* as comprising progressive courses of instruction of such length and in such subjects as are appropriate to the age, ability and aptitude of pupils who have been promoted from the primary schools. Promotion schemes are devised to allocate pupils to the courses from which each pupil shows reasonable promise of profiting. It may, therefore, be deduced that the criterion of success with which the promotion battery must be compared is the extent to which pupils have profited from the courses they have followed. The investigator, however, is merely transferred from one horn of the dilemma to the other, because he has still to discover a means of measuring the extent to which a pupil has profited from a course of instruction.

There are obvious objections to the use of examination marks as a measure of success, but *any* assessment of the extent to which a pupil has profited from secondary education is unreliable. The following case illustrates the difficulties in using one measure of educational success as a means of predicting success in another field:

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* Education (Scotland) Act, 1946, section 1 (3).

> Pupil X gained a Leaving Certificate with passes in six subjects all on the higher standard and his Rector reported 'Thoroughly recommend this young man, reliable in every way and a good student: very well suited to the course he intends to follow.' He matriculated at university with every prospect of a notable career, but at the end of his first year he had failed on two occasions in all his degree examinations. On any estimate this pupil would have been counted a success in his high school course. His teachers anticipated an outstanding university career, but the removal from the strict atmosphere of school to the freedom of university found him wanting in traits of personality and temperament.

Despite all their weaknesses, internal and external examinations or teachers' estimates form the only basis on which an objective measure of success in the secondary school can be based. The external examination has still a high prestige outside the school, and many parents and employers would be content to accept the results of the Leaving Certificate examinations as a means of judging whether a pupil had succeeded in a high school course which had lasted five or six years.

The value of the test battery in predicting general success was calculated at four stages in the high schools—at the end of the third, fourth, fifth and sixth years. For the fifth year, two criteria were used—first, the teachers' estimates which were submitted in connection with the Leaving Certificate Examinations and, secondly, the results of the Leaving Certificate Examinations. In addition, the value of the test battery in predicting success in English, French, Latin, mathematics and science in the fifth and sixth years was also calculated.

For the junior secondary school, the predictive value of the test battery for forecasting general success was found for each of the first three years of the course.

The correlations between each component of the battery and success in the secondary schools were calculated; in this inquiry, values are found for teachers' estimates in English and arithmetic separately, whereas in McClelland's investigation he gave the correlations for the combined estimates.

Computation of Success Marks in High Schools

1. *Third Year*

McClelland decided to take an average of the marks in all subjects of the course as a measure of general success, although there are, as he himself pointed out, objections to this procedure. In this investigation, the criteria and methods of measuring success in the high schools were fully discussed with the Rectors, and no decisions were taken without their full agreement. They strongly urged that music, art and physical education be omitted because of the lack of any uniform standard of assessment and of the variety of methods with which these subjects were taught in the different high schools.

Rectors were asked to estimate the attainment of each pupil at the end of the third year in the main subjects of the course on the following five-point scale:

A—well above average
B—above average
C—average
D—below average
E—well below average

These ratings had to be converted into numerical estimates in order that they could be used for calculation. For this purpose subjects were classified into major and minor categories. Major subjects were those, such as English and mathematics, to which 5 or 6 periods per week were allocated; minor subjects, such as history and geography, were those with a weekly allocation of 2 or 3 periods. For some pupils, however, homecraft, technical and commercial subjects could, on this basis, be termed major subjects, but as it appeared to be necessary to give due recognition to the more arduous two-language courses, these subjects were included among the minor subjects.

The major and minor subjects and the success mark equivalent of each grading were as follows:

Major Subjects
English
French
German
Latin
Mathematics
Science

Minor Subjects
History
Geography
Technical
Homecraft
Commercial

Grading	A	B	C	D	E
Success mark	8	6	4	2	0

Grading	A	B	C	D	E
Success mark	4	3	2	1	0

In computing the total success mark (S3) for each pupil, only seven subjects were taken into account, the major subjects being included first and the balance being made up from the minor subjects. In this way a pupil in a two-language course graded 'A' in all subjects (5 major and 2 minor) earned a maximum success mark of 48, whereas a pupil in a one-language course also graded 'A' in all subjects could only earn a maximum success mark of 44.

Rectors estimated that a pupil who had an S3 of 17 or more could generally be regarded as having satisfactorily completed a three years' course in a high school.

2. *Fourth Year*

Teachers' estimates of a pupil's performance in the Scottish Leaving Certificate examinations are submitted in the following broad ranges:

1. Outstandingly good	(70 per cent +)
2. Very good	(60–69 per cent)
3. Fairly sure pass	(53–59 per cent)
4. Borderline	(48–52 per cent)
5. Fairly sure failure	(43–47 per cent)
6. Very weak	(under 43 per cent)

The Rectors were asked to give their estimates of each pupil's success in the fourth year using these bands and to base their judgment on the standard expected of children in Leaving Certificate courses.

Success marks were calculated by converting the band estimates into success marks in the following way:

Higher Presentation		*Lower Presentation*	
Band Estimate	*Success Mark*	*Band Estimate*	*Success Mark*
1	12	1	6
2	10	2	5
3	8	3	4
4	6	4	3
5	4	5	2
6	2	6	1

The total success mark (S4) for a pupil was obtained by adding the success marks of the principal subjects of his course.

3. *Fifth Year*

Two measures of success were obtained in the fifth year; the first, S5, based on the actual estimates for Leaving Certificate candidates submitted to the Scottish Education Department in March, 1956, was calculated in the same way as S4. The second success mark, LC5, was obtained from the actual results in the Leaving Certificate examinations and was derived by totalling the success marks of the individual subjects in which the pupil was presented. The examination results were given as a range of marks from 1 to 12, and the percentage equivalent and the success marks allocated to each range were as follows:

Range	*Percentage equivalent*	*Success Mark*	
		Lower	*Higher*
1	85+	12	24
2	80–84	11	22
3	75–79	10	20
4	70–74	9	18
5	65–69	8	16
6	60–64	7	14
7	55–59	6	12
8	50–54	5	10
9	45–49	4	8
10	40–44	3	6
11	35–39	2	4
12	35–	1	2

4. *Sixth Year*

Success in the sixth year was also measured by the actual results in the Leaving Certificate examinations. If the pupil had already sat the examinations in the fifth year, his sixth year passes were added to the certificate, which could then be evaluated. The method of evaluating the certificate is outlined when the relation between the battery and success in the sixth year is being discussed.

Calculating the Correlations

There were eight high schools to which pupils from the promotion group were transferred. Since, even with the care taken to make marks uniform, the standards of estimating success by the high schools might vary, the correlation between the battery and the success marks had to be calculated for each school separately. The coefficients thus determined, however, do not give a true estimate of the relationship between the battery and success marks, because the pupils concerned are drawn from a restricted range of ability. Corrections were made by the use of the formula:

$$R_{ts}=\frac{r_{ts}+r_{as}\cdot r_{at}D}{\sqrt{(1+r^2_{as}D)(1+r^2_{at}D)}}$$

where t=a battery measure

R_{ts}=corrected correlation between battery measure and success mark

r_{ts}=uncorrected correlation between battery measure and success mark

r_{as}=correlation between AA and success

r_{at}=correlation between AA and battery measure

and $D=\frac{(\Sigma a)^2}{(\sigma_a)^2}-1$ where Σa=standard deviation of AA for promotion group

σ_a =standard deviation of AA for school

In the first instance, the correlation coefficients for the third year were calculated between each of the seven battery measures and S3 for each of the eight schools, that is 56 coefficients had to be determined. Next, the correlations between each of the six battery measures and AA were calculated for each school, which gave another 48 coefficients. The determination of Rts by the above formula meant 56 calculations, and the combination of the correlations for each school into one correlation (by Fisher's z) for the promotion group as a whole necessitated another 7 calculations in order to determine the 7 correlation coefficients which are given in Table II.

The work involved in finding the 104 correlation coefficients and in making the 63 calculations was done by Panel II.* A similar burden was laid upon their willing shoulders for subsequent tables, and the results represent many hours of concentrated effort which was well beyond the compass of any individual. That a large scale investigation of this nature was carried out entirely voluntarily by Fife teachers is a tribute to the enthusiasm and devotion which they bring to their calling.

CORRELATIONS FOR THE THIRD YEAR

Battery measures and success marks were available for 998 pupils from the eight high schools, and the predictive order of each measure of the test battery based on these results is given in Table II.

TABLE II

CORRELATION BETWEEN BATTERY AND THIRD YEAR HIGH SCHOOL SUCCESS MARKS

Measure	r	Rank
AA	·859	1
IQ_1	·774	6
IQ_2	·783	4
Qe	·813	3
Qa	·776	5
Tes	·835	2
Tas	·768	7

All the coefficients are fairly high and the differences between them are not great, hence their rank order cannot be taken as representing significantly different levels of relationship with the success marks. For example, there is really no difference between the correlations for IQ_1 and Qa although they are ranked as 6 and 5 respectively. Predictive efficiency is highest with the AA, which is what might be expected since it is a combination of all the individual measures; next come the measures of English, followed by the intelligence test results, and finally the measures of arithmetic.

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* See Appendix I.

A comparison with the McClelland data is of interest.

	Fife	*McClelland*
AA	·859	·804 IQ+Q+Ts
IQ_1	·774	·718 IQ
IQ_2	·783	
Qe	·813	·674 Qe
Qa	·776	·677 Qa
Tes	·835	·718 Ts
Tas	·768	

In the McClelland inquiry, the teachers' estimates for English and arithmetic were combined. The advantage of keeping the estimates separate is clearly seen, because it reveals that the estimate in English has a higher predictive value than the estimate in arithmetic, and that of all the individual measures of the battery, it gives the highest correlation with success marks at the end of the third year of the courses.

The superiority of the English test over the arithmetic test in the Fife inquiry is also noticeable, whereas in the Dundee investigation the two tests have almost the same predictive value.

The Fife correlations are higher than the corresponding measures in the McClelland inquiry. It is perhaps well to remember that the criterion of success used by McClelland included what might be described as non-academic subjects of the curriculum, whereas the Fife criterion consisted mainly of the academic subjects. The test battery is probably fundamentally a predictor of success in academic rather than in practical subjects.

McClelland's recommendation that a test battery consisting of the results of tests in intelligence, English and arithmetic and scaled teachers' estimates be used for allocating pupils to high school courses appears to have been soundly based.

Correlations for the Fourth Year

In the fourth year at high school pupils have begun to follow more specialised courses. Those whose interest lies in languages generally omit science from their courses, and many following a science course drop Latin from their curriculum. The entrance regulations of the universities and the professions play a large part in determining the subjects which many pupils study in the fourth, fifth and sixth year at high school.

Data were available for 483 fourth year pupils from the eight high schools and the correlations, corrected for attenuation, between the promotion battery and S4 are given in Table III.

TABLE III

Correlation Between Battery and Fourth Year High School Success Marks

Measure	r	Rank Order	
		4th Year	3rd Year
AA	·866	1	1
IQ_1	·822	3	6
IQ_2	·790	5	4
Qe	·847	2	3
Qa	·772	7	5
Tes	·821	4	2
Tas	·778	6	7

The predictive value of the measures for fourth year success, except for Qa and Tes, is greater than for third year success; it is difficult when the correlations are so high to increase the size of the coefficients by any appreciable amount.

The AA remains the best predictor and has increased its efficiency; the English test has become the best individual measure, whereas the arithmetic test has become the least efficient. There is evidence from other investigations that the predictive value of the intelligence test improves throughout the course, and this appears to be confirmed. The measures of arithmetic are now the poorest predictors, although the coefficients are higher than those established by McClelland.

CORRELATIONS FOR THE FIFTH YEAR

There are two measures of success in the fifth year—the teachers' estimates for the subjects in which the pupils sat the Leaving Certificate examinations and the results of these examinations. The correlation coefficients for 350 pupils are corrected for attenuation and are given in Table IV.

TABLE IV

CORRELATION BETWEEN BATTERY AND LEAVING CERTIFICATE ESTIMATES AND RESULTS

Measure	r		Rank	
	S5	LC5	S5	LC5
AA	·846	·853	1	1
IQ_1	·807	·812	4	3
IQ_2	·798	·800	5	5
Qe	·821	·834	2	2
Qa	·772	·756	6	6
Tes	·808	·808	3	4
Tas	·740	·742	7	7

The coefficients, although generally lower than those for the fourth year, follow the pattern already established; the best predictor is AA, followed in order by the measures of English, intelligence and arithmetic. Of the individual measures, the English test is the best, and the teachers' estimates in arithmetic the least efficient predictor, although it is worth noting that the latter coefficients are still higher than those found by McClelland.

The differences between coefficients for the Leaving Certificate estimates and for the actual examination results are slight. Five of the latter are slightly but not significantly greater than the corresponding coefficients for the estimates; the predictive value of Tes remains the same, and that of Qa has decreased. The rank order of the two sets of results is very nearly identical.

CORRELATIONS FOR THE SIXTH YEAR

At the sixth year stage in a pupil's career, he may be specialising in some subjects, adding to his group certificate, attempting to achieve the group certificate by adding subjects in which he failed in his fifth year, or attempting for the first time to gain a certificate, having repeated a year during his course. The measure of success was determined by whether or not he gained a group certificate after six years at school, and the method of calculating the correlation coefficients was one devised by Dr Walker.* These coefficients, based on the results for 213 pupils, are given in Table V.

TABLE V

CORRELATION BETWEEN BATTERY AND SUCCESS IN THE LEAVING CERTIFICATE AFTER SIX YEARS

Measure	r	Rank Order S6	S5	LC5
AA	·872	1	1	1
IQ_1	·796	4	4	3
IQ_2	·772	5	5	5
Qe	·802	3	2	2
Qa	·700	7	6	6
Tes	·865	2	3	4
Tas	·715	6	7	7

The correlations with sixth year success are more widely scattered than in any of the other years; AA reaches its highest predictive value and Qa its lowest. Tes becomes the individual measure with the highest correlation with success in the sixth year.

The rank order of the coefficients is much the same as those for the fifth year, and the general predictive order of the measures remains as before—the AA, English, what is measured by the intelligence tests, and finally arithmetic. A fuller analysis of the results for the individual measures is made in later chapters.

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* The Theory and Use of the Success Ratio, David A Walker, *British Journal of Statistical Psychology*, vol x, part ii, p 165, Nov 1957.

SUMMARY OF RESULTS

The correlations for the various years can best be summarised by means of a diagram or chart.

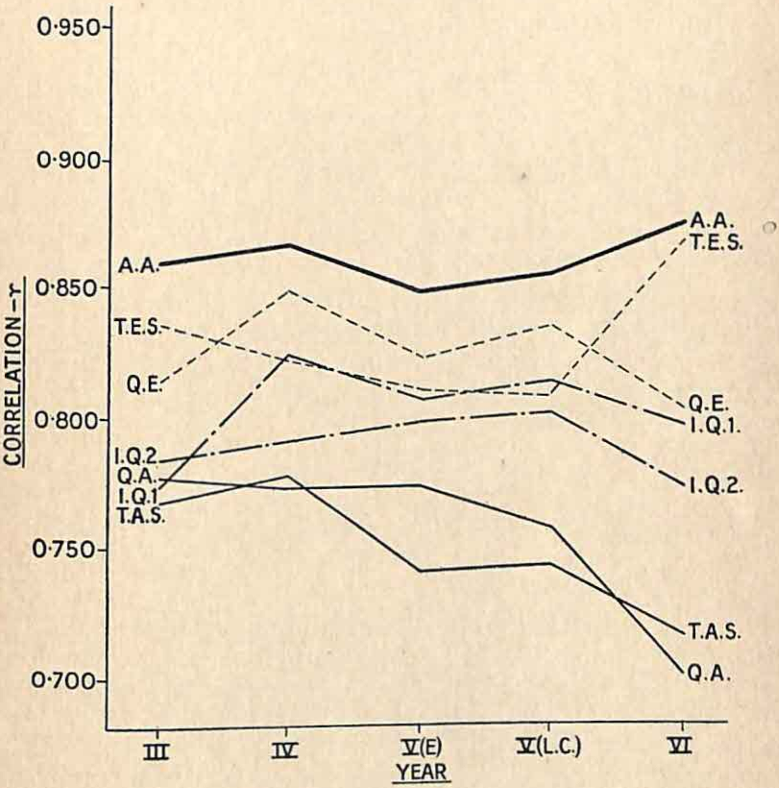

FIGURE 1 Correlation between Test Battery and Success in High School

From Figure 1 it is quite clear that, of the measures used in the Fife promotion scheme, the AA is the best predictor of success in high school courses. This confirms McClelland's conclusion that a test battery should include intelligence tests,

tests in English and arithmetic, and teachers' estimates in English and arithmetic.

The results are fairly consistent throughout the six years of the high school, and show that the order of predictive value is the measures of English, intelligence test results, and the measures of arithmetic.

The correlation coefficients obtained by the Fife data are consistently higher than those in the McClelland investigation.

CORRELATIONS BETWEEN BATTERY AND SPECIFIC SUBJECTS PASSED ON THE HIGHER GRADE

A measure of general success may favour all-round mediocrity at the expense of brilliance in one or two subjects, and it is, therefore, of some importance to find the predictive value of the battery for individual subjects. Correlations were therefore calculated between the battery measures and passes in English, French, Latin, mathematics or science on the higher grade after five years and after six years. The number of pupils in each subject group was as follows, the 6th year figures including the 5th year passes.

	5th Year	*6th Year*
English	235	299
French	104	135
Latin	53	60
Mathematics	104	158
Science	88	138

The method of calculation was the success ratio method, and as the correlations for five and six years appeared to be close, the latter were determined by the shorter graphical method. The coefficients are given in Tables VI and VII.

As a comprehensive view is more readily given in diagrammatic form, these are shown in Figures 2 and 3.

In the main the coefficients follow the pattern of general success, the predictive order being AA, English, intelligence and arithmetic.

For Leaving Certificate English on the higher grade, the best individual measure is Tes, and Qa falls to a very low level in

TABLE VI

CORRELATION BETWEEN BATTERY AND INDIVIDUAL SUBJECTS PASSED ON THE HIGHER GRADE AFTER FIVE YEARS

Battery Measure	English	French	Latin	Mathematics	Science
AA	·883	·875	·872	·848	·796
IQ_1	·801	·795	·806	·772	·696
IQ_2	·805	·809	·807	·796	·749
Qe	·839	·811	·805	·738	·690
Qa	·689	·685	·709	·702	·655
Tes	·878	·881	·867	·805	·731
Tas	·763	·749	·765	·755	·703

TABLE VII

CORRELATION BETWEEN BATTERY AND INDIVIDUAL SUBJECTS PASSED ON THE HIGHER GRADE AFTER SIX YEARS

Battery Measure	English	French	Latin	Mathematics	Science
AA	·87	·88	·89	·84	·80
IQ_1	·79	·73	·80	·76	·72
IQ_2	·85	·77	·79	·76	·72
Qe	·82	·79	·87	·72	·70
Qa	·68	·65	·67	·77	·67
Tes	·86	·81	·87	·80	·74
Tas	·79	·71	·77	·76	·70

comparison with the other coefficients, although it must be emphasised again that the coefficients for arithmetic are as high as the McClelland figures for general success. In the case of French, after five years, the coefficient for Tes becomes even greater than that for AA. It should be noted, however, that the range among the coefficients is relatively small and many of the differences are not significant.

The coefficients for mathematics and science are lower than for the other subjects; that for Qe becomes much smaller and

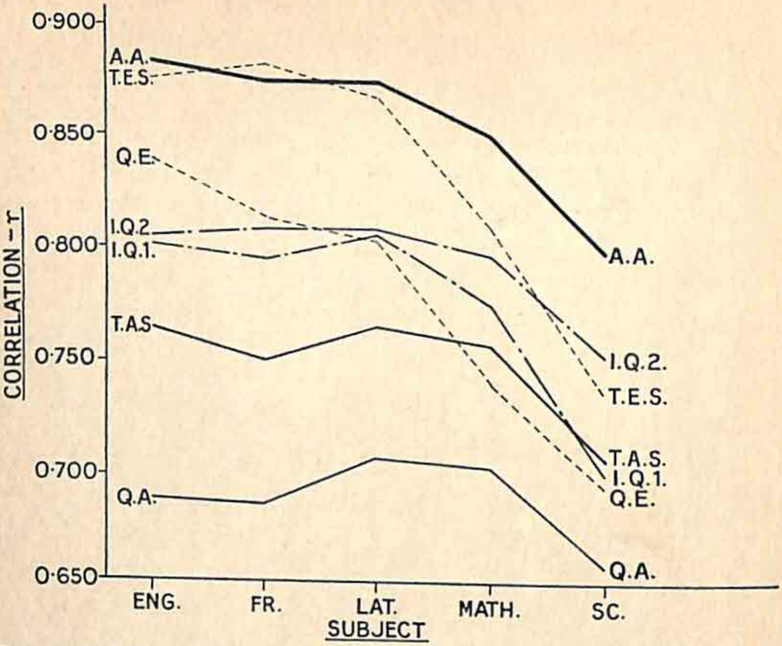

FIGURE 2 Correlation between Test Battery and Individual Subjects Passed on the Higher Grade after Five Years

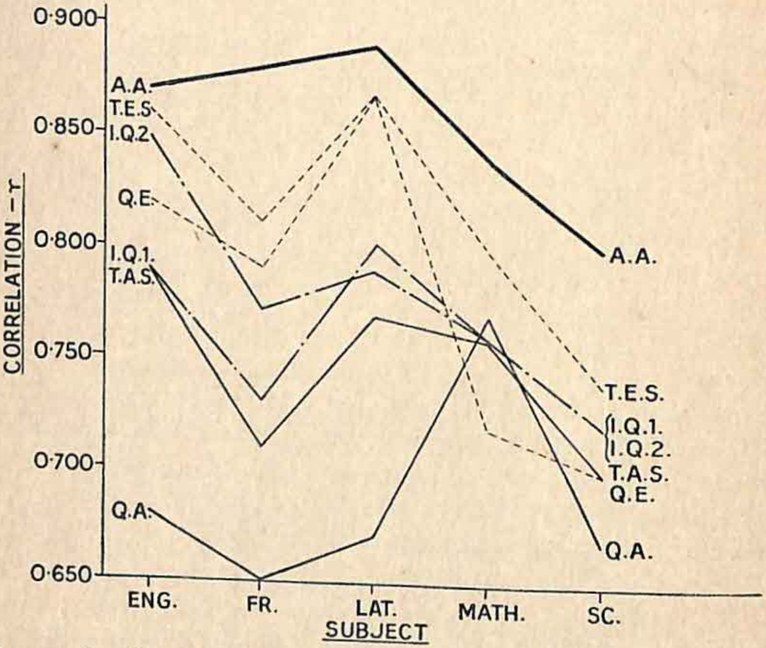

FIGURE 3 Correlation between Test Battery and Individual Subjects Passed on the Higher Grade after Six Years

there is an improvement in the pedictive value of Tas. For science the coefficients are lower than those for mathematics: Qa falls to its lowest level, and there is a slight increase in the predictive value of Tas. Further discussion on Leaving Certificate attainment in mathematics and science is given in a later section.

It would appear from these results that the battery predicts the book-based subjects more accurately than mathematics and science. The practical nature of science may require some other ability than that shown at the promotion stage by the battery measures.

SUCCESS IN THE JUNIOR SECONDARY SCHOOL

Difficult as it may be to evaluate the success of a pupil who has followed a high school course, it is even more difficult in the case of the pupil in the junior secondary school.

In the large junior secondary schools in Fife the pupils enrolled from the feeding primary schools are generally classified by the headteachers according to their adjusted average. As far as possible, classes of homogeneous ability are formed; the basis is frankly academic since too little is known of special aptitudes at this stage. This sorting out process normally results in the formation of four streams designated 'A', 'B', 'C' and 'D', though this nomenclature is purely internal and may have no connection with other classifications of secondary pupils.

It is now generally recognised that the school curriculum must be fitted to the child and not the child to the curriculum, hence there are independent schemes of work for each group. This means that the scheme for 'B' pupils is not merely a simplified version of the scheme for 'A' pupils, nor will the pupils in the 'C' stream necessarily study the same subjects as those in other groups; there are differences both in the subjects and in the allocation of time to the subjects in each course. Some of the major differences are as follows:

The curriculum of girls in 'A' classes generally includes commercial subjects. In 'B' and 'C' classes girls may have 7 to 9 periods of homecraft, while those in 'A' classes may have only 2 periods.

Mathematics taught to the 'A' group boys has a more academic bias than when taught to the 'B' and 'C' groups where the emphasis is on arithmetic and simple mensuration. Girls have no mathematics as such: they concentrate on arithmetic.

Boys in 'C' and 'D' classes sometimes have cobbling or gardening as characteristic subjects.

Certain problems are bound to arise, therefore, in the assessment of marks.

A pupil in a lower stream with an easier curriculum can achieve marks which are higher than those attained by a pupil following a harder course of study. If a comparison is to be made between the promotion battery and secondary school success as measured by class examination marks, pupils must be ranked not only in relation to their own class but also in relation to the whole of their school population at the same stage of work. Within the school, class marks in the various subjects are made comparable by a system of scaling.

Pupils of the lowest intellectual calibre in the secondary school cannot be given the normal type of examination: some of them can read only with difficulty. Such pupils are formed into small classes with a specially simplified curriculum. While they are given examinations of a sort, these are usually assessed not quantitatively but qualitatively by an ABCDE rating. Accordingly, this small group of pupils was not included in the number for whom success marks were available.

The scaling of class marks is an operation whereby the mean and scatter of the class marks in each subject are made equal to some assigned mean and scatter. The variable means of the class marks must be pegged to some external criterion of ability, and the simplest measure of this is the mean adjusted average or the mean IQ of the class. A typical set of assigned mean marks is as follows:

	Stream		
	A	B	C
First year	60	55	48
Second year	61	56	46
Third year	60	54	46

From experience, also, it has been found that class marks normally have a standard deviation of about 10, and the scatter of all class marks is transformed to this figure. The method of calculation is fully explained in *The Scaling of Teachers' Marks and Estimates*.*

There is something to be said for excluding from scaling those subjects which are not fundamentally academic and where time allocations differ from group to group. The outstanding example of this is homecraft, where 'A' stream girls have two periods of instruction, while a 'C' group girl may have six to nine periods per week. It is obvious that greater practice leads to increased efficiency in this subject, and it would therefore be an anomaly if a 'C' group girl with high efficiency were pegged to a low mean while an 'A' group girl got a bonus from her high 'class mean'. Where non-academic subjects have comparable allocation of time, this anomaly is less likely to occur.

CALCULATION OF SUCCESS MARKS IN JUNIOR SECONDARY SCHOOLS

Examinations were set twice a year, and the average of the two term examination marks was given as a yearly mark in a subject. Each pupil's success mark for the year was the average of his yearly marks in the examinable subjects of the course.

As in the case of the high schools, subjects such as physical education were not included in those which determined the success marks.

CORRELATIONS BETWEEN SUCCESS MARKS AND THE BATTERY

Three large junior secondary schools, designated P, Q and R, provided the data on which were calculated the correlation coefficients between success and the battery measures. The success marks were available for each of the first three years of the secondary course of all pupils except those in what has been described as a 'D' course. The class examination marks from the three schools were scaled in the manner described in the previous section.

The correlation coefficients which are given in the following tables are uncorrected for range. As the group of pupils concerned does not include a large number from the high ability levels and excludes a small number of those of low intellectual ability, the correlation coefficients between success in the junior secondary school and the promotion battery would probably be larger if they were corrected for range.

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* *The Scaling of Teachers' Marks and Estimates*, McIntosh, Walker and Mackay, Oliver & Boyd, 1949.

School P

This was a long-established school with an excellent tradition, at which many pupils of 'A' calibre in the district elected to take their secondary education, the 'A' commercial non-language course for girls being a particular attraction. The number of pupils for whom data were available was 244, 234 and 234 respectively for each of the first three years. Table VIII gives the correlations between the battery measures and success in each of the first three years of the course. These figures are illustrated graphically in Figure 4.

TABLE VIII

CORRELATION BETWEEN BATTERY AND SUCCESS IN SCHOOL P

Battery Measure	*Year* I	II	III
AA	·819	·778	·771
IQ_1	·735	·711	·699
IQ_2	·744	·709	·725
Qe	·660	·644	·627
Qa	·693	·658	·653
Tes	·735	·669	·683
Tas	·739	·692	·679

From Table VIII and Figure 4 it is clear that the AA has the highest predictive value.

The most interesting result perhaps is the relatively low correlation of Qe with the success marks, which may be accounted for by the large proportion of time in the junior secondary courses devoted to practical subjects. The arithmetic test is, also, shown to be a less efficient predictor than the other measures.

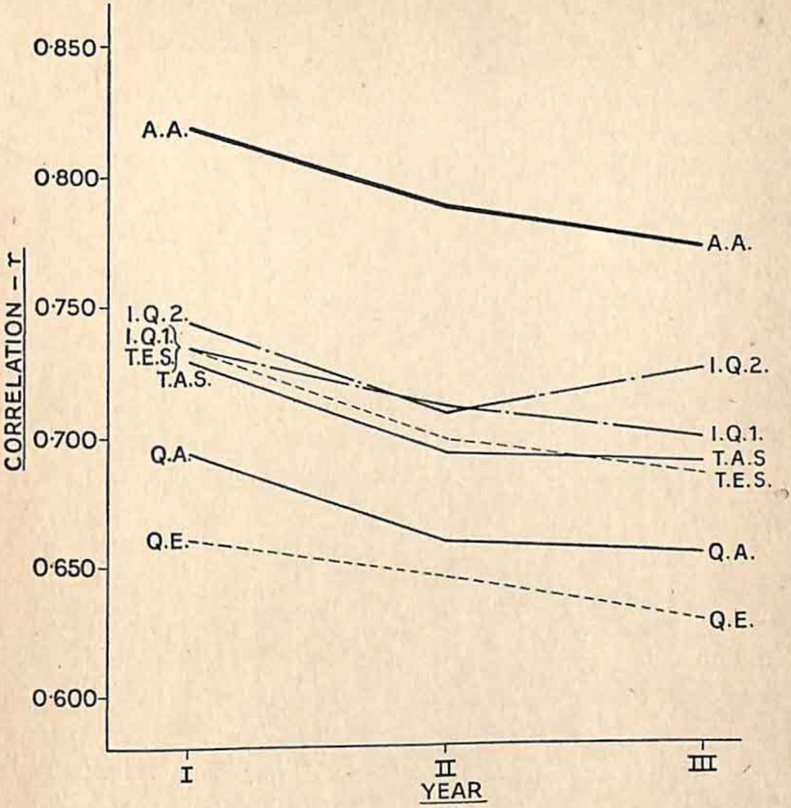

Figure 4 Correlation between Battery and Success in School P

The general order of predictive value appears to be AA, the intelligence tests, teachers' estimates and, finally, the objective tests. There is generally a slight decline in the predictive value of each measure from the first to the third year.

School Q

This school, situated in an area in which there was an Admiralty dockyard, provided special courses for the boys who wished to sit the dockyard entrance examinations, and the proportion of boys taking these courses was substantial. The number of pupils for whom data were available was 149, 147

TABLE IX

Correlation Between Battery and Success in School Q

Battery Measure	*Year* I	II	III
AA	·723	·703	·702
IQ_1	·672	·646	·646
IQ_2	·629	·656	·636
Qe	·618	·619	·652
Qa	·754	·716	·713
Tes	·650	·637	·636
Tas	·706	·685	·675

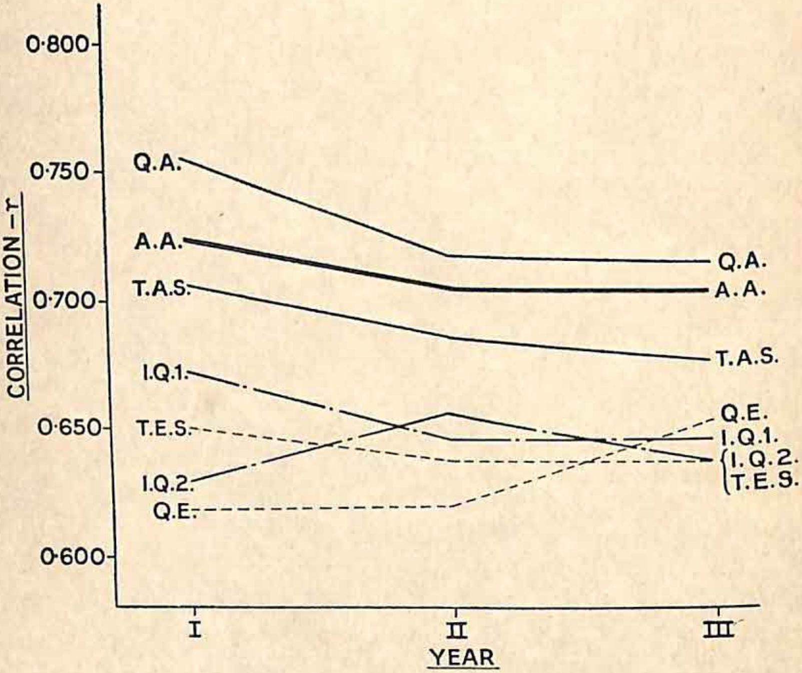

FIGURE 5 Correlation between Battery and Success in School Q

and 134 respectively for each of the first three years. Table IX gives the correlation coefficients which are illustrated in Figure 5.

The results show that, of the battery measures, Qa has the highest predictive value, although the correlation coefficients on the whole are lower than for school P. Tas follows in order after AA, and the probable explanation of the relatively high predictive value of the measures of arithmetic is that, because of the special preparation for a specific external examination, much of the curriculum had a bias towards mathematics and science. There is little to distinguish between the other measures, although the English test is again one of the least efficient predictors. As with school P, there is a tendency for the coefficients to decrease in size over the three years.

School R

At the time of the inquiry this school did not provide an 'A' commercial non-language course for girls, although one was introduced a year later. The number of pupils involved in the calculation of the correlation coefficients is 189, 182 and 179 respectively for each of the first three years. Table X and Figure 6 give the correlations and their diagrammatic representation.

TABLE X

CORRELATION BETWEEN BATTERY AND SUCCESS IN SCHOOL R

Battery Measure	*Year* I	II	III
AA	·646	·669	·584
IQ_1	·458	·508	·411
IQ_2	·498	·506	·443
Qe	·473	·456	·386
Qa	·505	·565	·473
Tes	·516	·506	·459
Tas	·593	·614	·561

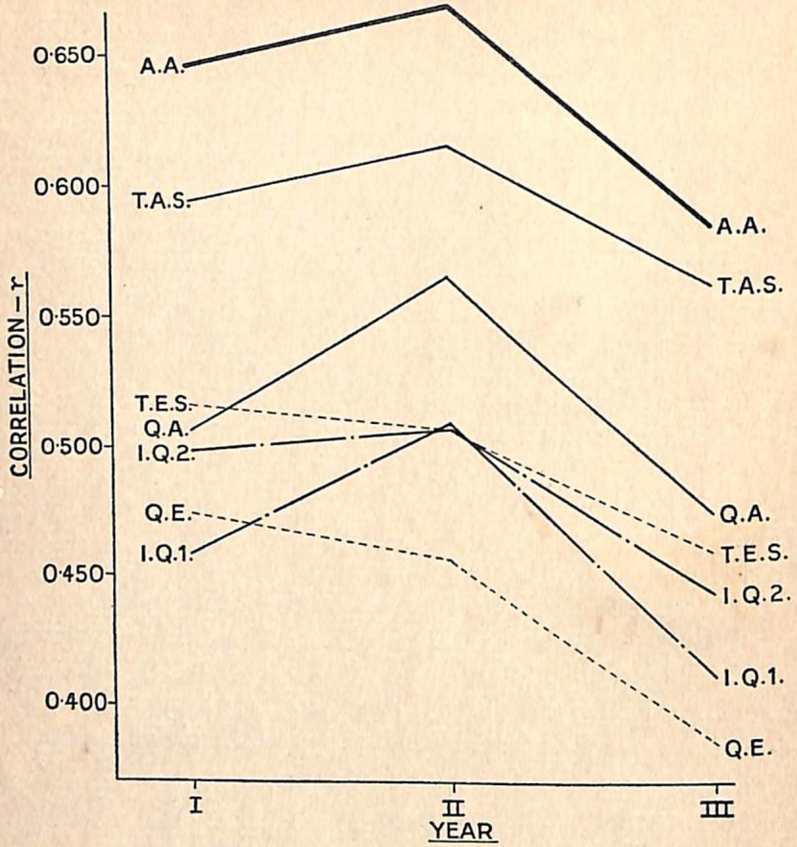

FIGURE 6 Correlation between Battery and Success in School R

The correlations on the whole are lower than for the other schools, and also show a decline from first to third year. The AA is the best predictor, followed by Tas and Qa. It would appear to confirm the conclusion that the non-literary character of the curriculum tends to favour measures in arithmetic as the best predictors of general success in the junior secondary school. Qe is again relatively the least efficient predictor of the battery measures.

Combined Schools

The results for the three schools were combined, although there may be a weakness in this procedure. As already indicated, the schools have developed a character of their own, and since there is no common external criterion such as the Scottish Leaving Certificate, the success marks of each school are not necessarily measuring the same abilities and skills. On the other hand, they are a measure of general success in each of the schools.

Table XI and Figure 7 give the combined correlations and the diagrammatic illustration of them.

TABLE XI

CORRELATION BETWEEN BATTERY AND SUCCESS IN SCHOOLS P, Q AND R

Battery Measure	*Year* I	II	III
AA	·726	·711	·687
IQ_1	·636	·633	·603
IQ_2	·651	·635	·621
Qe	·598	·594	·583
Qa	·682	·673	·648
Tes	·656	·624	·612
Tas	·699	·681	·651

The AA is shown to be the most efficient predictor of success in the junior secondary school, and there is a general decline in all the correlations from the first to the third year. The measures of arithmetic are the best predictors of success in the junior secondary school and may reflect the high proportion of time allocated to practical subjects. Qe is relatively the least efficient predictor of success in the junior secondary school, which is in complete contrast to its predictive value for high school success.

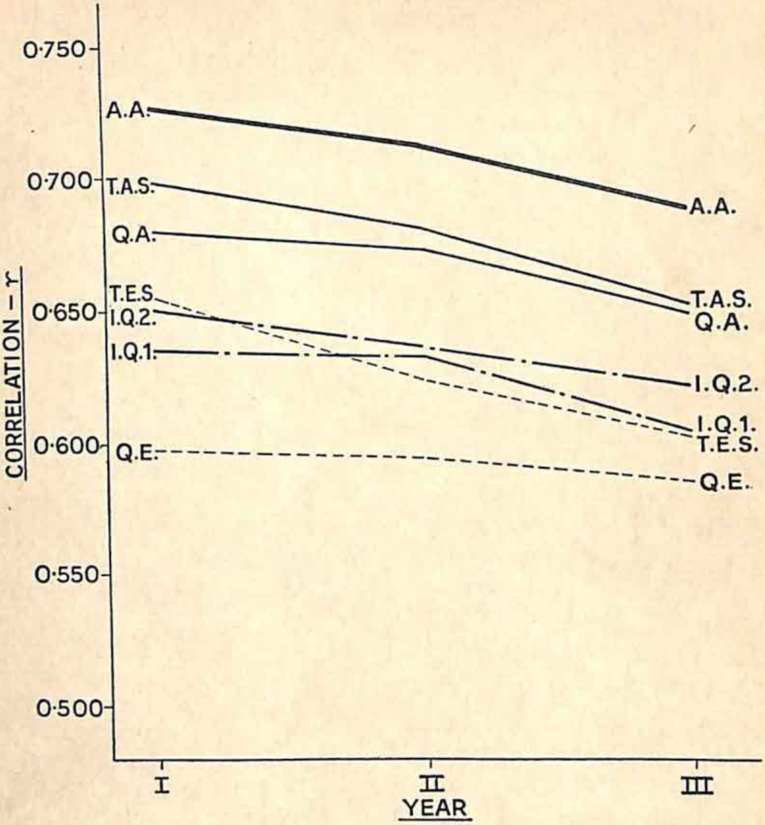

FIGURE 7 Correlation between Battery and Success in Schools P, Q and R

GENERAL CONCLUSIONS ON THE PREDICTIVE VALUE OF THE PROMOTION BATTERY

McClelland's recommendation that the promotion battery consist of intelligence tests, teachers' scaled estimates and objective tests in English and arithmetic is still valid under the new conditions which have been introduced into Scottish education since the time of his inquiry. With improvements on the tests and in the techniques of dealing with marks, the predictive value of the battery has been increased. The promotion battery is a satisfactory measure for allocating pupils to secondary courses of instruction both in the senior secondary and the junior secondary school.

It appears, however, that the battery tends to be a better predictor of success in courses which are predominantly literary in character. For individual subjects at the Leaving Certificate stage, it predicts success in subjects such as English, French and Latin more efficiently than subjects with a practical bias such as mathematics and science.

Of the individual measures of the battery, the measures of English are the most efficient with the senior secondary courses and least efficient with the junior secondary courses. On the other hand, the measures of arithmetic are least efficient with the senior secondary courses and most efficient with the junior secondary courses. The order of predictive value of the measures with high school success is AA, measures of English, IQ, and measures of arithmetic, whereas with the junior secondary success it is AA, measures of arithmetic, IQ, and measures of English.

All the individual measures in the battery have their part to play and none should be omitted from it.

CHAPTER IV

THE WISHES OF THE PARENTS

The Education (Scotland) Act, 1946 lays down the general principle that 'pupils are to be educated in accordance with the wishes of their parents'. There are two provisos: first, that the choice of course will not involve an Authority in 'unreasonable public expenditure'; secondly, that the pupil shows 'reasonable promise of profiting' from the course desired by the parent. The Act also makes it mandatory upon an Education Authority to consult a parent before deciding the secondary school or department to which they consider a child should be promoted, and all promotion schemes must contain adequate provision for consultation with parents.

The majority of parents accept the primary headteacher's guidance on the secondary course which their children should follow. There is a minority who are reluctant to do so, and they can be roughly classified into two categories; first, the ambitious parent who is unwilling to accept the opinion of the primary school teacher that his child is unable to profit from a particular course of instruction, and, secondly, the parent who has little interest in his child's education, wishes him to leave school as soon as possible, and chooses the course which will cause the child and home least bother.

In the first group are those who wish their children to follow a high school course and are bitterly and understandably disappointed when they learn that their child is not to be given an opportunity to attempt such a course: their ambitions are often not entirely dissociated from social aspirations. It is from such parents that most of the criticisms of promotion schemes come. Small though the second group may be, they create a feeling of disappointment and resentment among primary school teachers when they see talented children, upon whom they have spent time and energy, debarred from a professional career because of parental indifference.

There has, however, been a change in the attitude of parents during the past few years; many more parents are opting for high school courses and fewer pupils of 'A' calibre are being enrolled in B1 courses.

TABLE XII

PERCENTAGE NUMBER OF PUPILS OF 'A' CALIBRE IN THE COURSES OF THEIR CHOICE

Course	Year						
	1950–1	1951–2	1952–3	1953–4	1954–5	1955–6	1956–7
A	57	66	76	81	85	82	79
A Com. Tech.	35	27	17	14	10	14	17
B	8	7	7	5	5	4	4

Table XII gives the percentage number of pupils of 'A' calibre allocated to 'A' and 'B' courses, and the general trend of these figures is illustrated diagrammatically in Figure 8.

It should be explained that in session 1955–56 there was instituted an 'A' (technical) course for boys in secondary schools, corresponding to the 'A' (commercial) course for girls, which was intended to attract able boys who would definitely be leaving school when they reached the statutory leaving age. The decrease in the number of pupils in 'A' courses and the corresponding increase in the numbers in 'A' (technical/commercial) courses during the sessions 1955–57 are explained by the institution of this course.

Notable features of Table XII are the increase in the number of pupils opting for 'A' courses and the decline in the number of pupils of 'A' calibre in 'B' courses.

It would be difficult to establish reasons for the change in attitude of parents, but three factors may be suggested. First, the raising of the school leaving age to 15 years may have

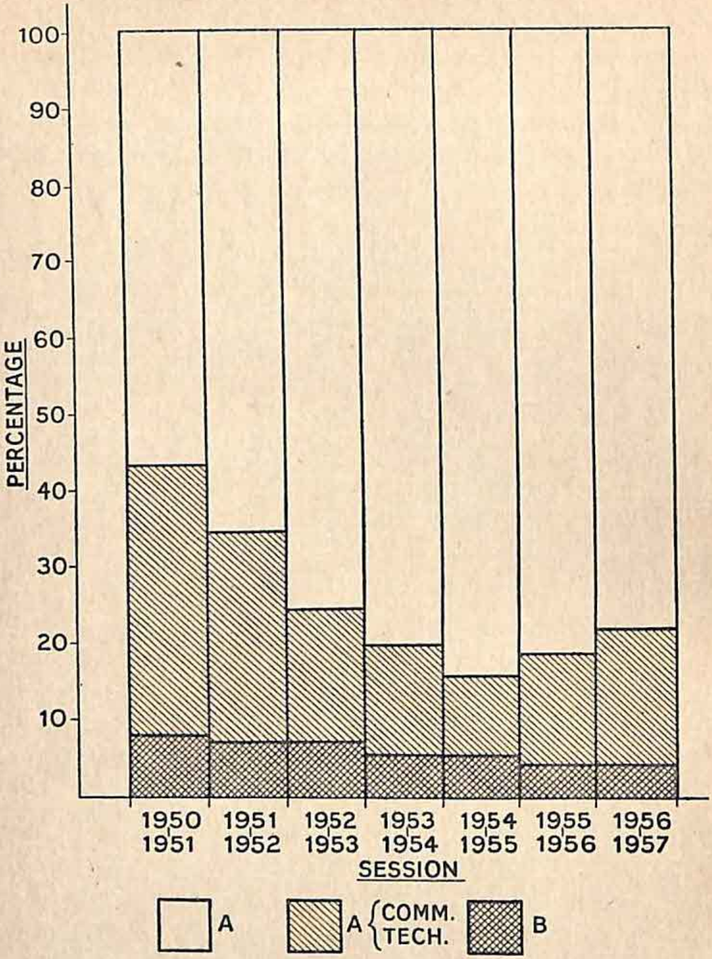

FIGURE 8 Percentage of Pupils of 'A' Calibre in the Courses of their Choice

encouraged parents to allow their children to embark on a five-year course. The able young child transferred to a secondary course before the age of 12 years must stay in any case until the fourth year, hence the parents can be persuaded more readily to enrol their children in a high school course which involves little more than an extra year at school. Secondly, the increasing efforts to draw public attention to the lack of sufficient recruits for the professions may be encouraging parents to keep their children at school for a longer period. Primary school teachers are, according to their own testimony, making greater efforts to point out the advantages of high school courses for the able child. Thirdly, increasing financial aid has also made it possible for parents to keep their children at school beyond the statutory school leaving age. In the developing industrial areas. also, there are few signs of unwarranted financial hardship. There can be little doubt that the pressure from all sides to encourage children to take high school courses is greater now than it has ever been.

The extent of the agreement and disagreement between the parents and the Transfer Board is shown in Table XIII.

TABLE XIII

PARENTS' WISHES AND BOARD'S DECISION

Course		*Board*				Total
		A	B1	B2	Retain	
	A	1,216	472	20	26	1,734
	B1	12	1,621	322	1	1,956
Parent	B2	—	37	685	1	723
	Retain	—	—	—	3	3
	Total	1,228	2,130	1,027	31	4,416

From Table XIII it may be deduced that there is an 80 per cent agreement between parent and Board, 19 per cent disagreement, and approximately 1 per cent deferred decisions. Of the 19 per cent disagreement, 18 per cent is caused by the Board giving a 'lower' course than the one desired by the parents and 1 per cent by the Board allocating pupils to 'higher' courses.

Of the 18 per cent disagreement where the Board allocated to a lower course, 11 per cent were refusals to grant an 'A' course and 7 per cent refusals to grant a B1 course.

Before studying the results of Table XIII in detail, the comparison between the wishes of the parents and the headteachers' recommendations might be examined. These are given in Table XIV.

TABLE XIV

Parents' Wishes and Headteachers' Recommendations

Course		Headteacher A	B1	B2	Retain	Total
	A	1,295	381	34	24	1,734
	B1	29	1,526	394	7	1,956
Parent	B2	1	26	684	12	723
	Retain	—	—	—	3	3
	Total	1,325	1,933	1,112	46	4,416

From Table XIV it can be deduced that there is approximately a 79 per cent agreement between parent and headteacher, just slightly less than that between parent and Board, and approximately 19 per cent disagreement which is made up of 18 per cent recommendations for a lower course and 1 per cent recommendations for a higher course. The 18 per cent disagreement where the headteacher recommended lower courses is shared equally between refusal to recommend 'A' and refusal to recommend 'B' courses.

It hardly requires a statistical analysis of Tables XIII and XIV to show that there is the same measure of agreement between parent and Board as between parent and headteacher. None the less, it is useful to express relationship by a figure; in this case the measure is the coefficient of contingency C. For Table XIII, C=·720 and for Table XIV, C=·719. It might be assumed that the Board's allocation and the headteachers' recommendations are identical: this is not the case. The comparison is given in the next chapter.

The main interest in these data centres upon the extent to which the Board refused to grant the course desired by the parents, particularly where the parents wished an 'A' course. From Table XIII it can be seen that there are 492 such cases. 472 of them were allocated to B1 courses and 20 to B2 courses.

Not all such cases are borderline; in some instances the pupils would clearly be quite unable to profit from an 'A' course. Table XV gives the distribution of the adjusted averages of the 492 pupils.

TABLE XV

DISTRIBUTION OF AAs OF PUPILS ALLOCATED TO B1 AND B2 COURSES WHOSE PARENTS WISHED AN 'A' COURSE

AA	B1	B2
70–74	153	—
65–69	168	—
60–64	103	—
55–59	39	—
50–54	8	11
45–49	—	6
40–44	—	2
35–39	—	1
No. av.	1	—
Total	472	20

The pupil for whom no AA was available had acute rheumatic fever at the time of the achievement tests, but as her IQ was 103 and her class work on a similar standard, she was allocated to a B1 course. After a secondary school career which was interrupted by frequent illnesses, she left school at the end of her third year to become an assistant in a shoe shop.

The smaller number of pupils in the class interval 70–74 than in 65–69 is explained by the fact that several of the pupils near the pass mark of 75 were allocated to 'A' courses.

It is perhaps instructive to examine the case history of a pupil whose AA was 35 but whose parents wished him to follow an 'A' course. This boy, from a reasonably good home, was given every encouragement from his parents and, although he tried hard, could make little of English in the primary school and found the subject difficult in his secondary course. He was good with his hands and did well in the cobbling class, and, thanks to his interest in the subject, was encouraged to take it up as a career and become an apprentice shoe repairer. It would have been educational folly to have allowed this boy into an academic course, and no doubt the parents were ultimately grateful for the Board's decision.

Another case illustrative of the parent's wish being not in accordance with the best interests of the pupil's education is that of a pupil with AA 50 whose headteacher recommended him for a B2 course. This boy, although he was handicapped by a bad stammer, took an intelligent interest in school. He continued at school for three years, leaving to become an apprentice motor mechanic. The course to which he was allocated was one from which he undoubtedly profited, and if the parent's wish had been granted, the boy would have been struggling to deal with a curriculum which was beyond his intellectual capacity.

PUPILS WITH AA ABOVE THE PASS MARK IN 'B' COURSES

One hundred and thirteen pupils whose AAs were above the pass mark were allocated to 'B' courses by the Board's recommendation; in all such cases the parents did not wish their children to enrol in high school courses. The distribution of their AAs was as follows:

AA	*Boys*	*Girls*	*Total*
85+	2	—	2
80–84	18	5	23
75–79	51	37	88
Total	71	42	113

A noticeable feature of the above distribution is the disproportionate number of boys, and for this apparent anomaly there is a possible explanation. The commercial course for girls offers an education which may be completed in three years and, as there was no corresponding course for boys when the inquiry began, many parents were unwilling to commit themselves to keeping their boys at school for five or six years.

Several of the 113 pupils might have successfully completed a Leaving Certificate course if given the opportunity. For example:

Pupil 28 (boy—AA 86). This pupil did exceptionally well in a B1 course, finishing first in his class of 36 at the end of the three years. His parents were persuaded to allow the boy to continue his education in a pre-apprenticeship course in building.

The interest of the headteacher can direct an able pupil into employment in which his talents may be further developed. For example:

Pupil 804 (boy—AA 86). This pupil did very well in his B1 course and continued at school for a fourth year. When he left, he was employed by the National Coal Board as a mining trainee, but, thanks to the intervention of the headteacher, he was transferred to the surveying department and continued his education at a Central Institution, where his progress justified the hope that he might gain a scholarship and ultimately take a university degree in mining.

There are fewer opportunities for girls continuing in full-time education than for boys, and the following case illustrates one of the more fortunate girls:

Pupil 901 (girl—AA 84). This pupil did well in her 'B' course and was regarded as one of the best pupils in her school. She gained admission to a pre-nursing course and her progress indicates that she will enter a type of employment for which she is well fitted and for which her education will have been of considerable help.

The building of a second educational highway is important if able pupils who are not permitted to enrol in high school courses are to develop their potential ability to the full. Thanks to the national concern for technical efficiency, there are many opportunities for able boys who leave junior secondary schools to continue their education at local technical colleges either by day release or by evening continuation classes and from thence to Central Institutions where they can take what is equivalent to a university degree course. Unfortunately, this road is open in the main only to boys; for girls leaving school at fifteen there are courses which provide a training for commerce, nursing and the catering industry but little opportunity of continuing their education to reach a course of degree level. This is a matter which deserves special attention.

AGAINST THE WISHES OF THE PARENTS

At the time of the inquiry the Transfer Board were following a policy of trying to persuade parents whose children had an AA of 80 or greater to alter their original choice of course from B1 to A. It was hoped that these children, if successful in their high school courses, would be encouraged to continue at school to the Leaving Certificate stage.

The parents of 12 children (8 boys and 4 girls) ultimately agreed to enrol their children in high schools after being interviewed by the headteachers of their primary schools. There were 4 boys and 2 girls in each of the September and February groups.

Not one of these pupils remained at school beyond the statutory school leaving age, and only one of them continued in a full-time course of education—a boy who enrolled in a pre-apprenticeship engineering course.

The mean success mark of the 12 pupils at the end of the third year nevertheless was 20, and some of them did very well during the three years in the high school course, 6 of them being classified as capable of gaining a group Leaving Certificate. The following are typical cases:

Pupil 1475 (girl—AA 87, S3 34). She was ultimately exempted from attendance at school because of home conditions. The Rector reported that her home background was economically poor and that with encouragement the girl could have done even better. She entered employment with a Co-operative Society.

Pupil 892 (girl—AA 83, S3 33). Her Rector indicated that she was a good pupil but that the parents were unco-operative, and there was little attempt at homework during her school course. She also left school immediately on reaching the statutory leaving age and became a clerkess in a Co-operative Society's offices.

The home obviously plays a large part in determining whether a pupil will be successful in a high school course. In 7 cases out of the 12, the Rectors reported that adverse home conditions prevented the children from continuing at school. The following are three typical cases:

Pupil 1240 (boy—AA 82, S3 23). He was ninth in a family of ten, his father being a miner. He worked hard at school, but left to become a clerk immediately he reached the statutory leaving age.

Pupil 1483 (boy—AA 83, S3 21). He was fifth in a family of five. He had a paper round before leaving school. His widowed mother, a school cleaner, had to withdraw the boy from school as soon as possible to implement the family income, and he became a clerk with British Railways.

Pupil 1243 (boy—AA 89, S3 20). He was fourth in a family of five. The boy himself was not keen on studying and did not wish to go to the high school. The father agreed with great reluctance to allow him to be enrolled in such a course, but wished him to leave school as soon as possible. He had little ambition to do well in the high school and left to become an apprentice painter.

Ill health, too, can account for failure in high school courses. Two boys out of the 12 pupils did poorly because of a bad record of illness; both were off school for long periods and found it difficult to keep up with their studies.

The home and the health of the pupils play an important part in determining success or failure in high school courses. It is evident that without encouragement from the home there is little likelihood of a pupil remaining at school beyond the statutory leaving age. The problem, a philosophical one and not to be solved by experiment, is whether it would have been to the ultimate interest of the 12 pupils to have followed the secondary courses desired in the first instance by their parents or the high school courses which in fact they undertook.

SUCCESSFUL APPEALS

Parents were given an opportunity of appealing against the decision of the Transfer Board either through the headmaster of the primary school or directly to the Director of Education. Appeals which came direct, however, were always referred to the headteacher of the primary school for his views before a decision was taken by the Board. Headteachers were expected to submit evidence in support of their claims for any revision of the Board's decisions.

Pupils for whom the appeals were made were generally borderline cases with AAs of 74 or 73, although in the following exceptional instance a successful appeal was made on behalf of a child whose adjusted average was 70:

Pupil 2315 (boy—AA 70). The parents of this boy were very anxious that he should realise his ambition to attend a technical college. He worked hard at school and his scores were above what would normally be expected of a child with an IQ of 101. The head-teacher supported the appeal, stating that group tests did not do justice to boy's innate ability. The County Psychologist was asked to investigate and recommended admission to high school as the boy's IQ was 111 by individual testing and he tended to be excited at examination time. He was therefore granted provisional enrolment in a one-language course. His success mark at end of third year was 23; in his fifth year he gained passes in history (L), French (L) and science (L). He returned for a sixth year and gained English (H), mathematics (L) and science (H), leaving school to become an industrial chemist.

There were in all 19 successful appeals (14 girls and 5 boys).

Two pupils were transferred to other areas before they had started on their high school courses and there were thus 17 case histories to be studied. The allocation of the pupils to the various secondary courses was as follows:

(*a*) two-language	3
(*b*) one-language	8
(*c*) commercial with language	4
(*d*) commercial without language	2

A summary of the progress of these 17 pupils is given according to the course which they followed.

(*a*) 2 girls and 1 boy

All three pupils dropped Latin at the end of the first year, but remained at school till the end of the third year although they had reached the statutory school leaving age during the session. None was, however, considered to be an able leaver (see Chapter VII). The occupations and success marks of the three pupils were as follows: clerkess (24), machinist in plastics factory (15), clerk (12).

(*b*) 5 girls and 3 boys

Two pupils continued to the Leaving Certificate stage. One of these was case history 2315 described above, and the second a boy who repeated his first year but who nevertheless continued at school, sitting his Leaving Certificate examinations in his sixth year.

One pupil continued in a one-language course until the end of the third year (S3 29), completed a fourth year intensive commercial course, and then left school to become a clerkess.

Four pupils (three girls and one boy) left after completing three years of the course on which they started. The boy (S3 20) injured his leg and was frequently absent from school, but entered a pre-apprenticeship catering and baking course. Two girls (S3 17 and 6) became clerkesses, while the third (S3 8) became a kitchenmaid; all three remained at school beyond the statutory school leaving age.

One pupil was made to repeat the first year of the course but transferred to a commercial course, leaving school at the end of the second year to enter a full-time course of further education in a pre-nursing school.

(*c*) 4 girls

One repeated the first year and left in the second year to enter a pre-nursing course. Two became shop assistants and one (S3—16) became a typist, these being the only pupils in the successful appeal group who left school on reaching the school leaving age.

(*d*) 2 girls

One completed the third year and the other the fourth year of the course, both becoming clerkesses.

Of the 17 pupils whose parents were successful in their appeals against the Board's decision, two remained at school and sat the Scottish Leaving Certificate. One completed the fourth year intensive commercial course, and three after leaving school continued in full-time further education in prevocational courses. Only two left before completing the third year of the course, although all completed three years' education: these pupils had to repeat the first year of the course because they had found it too difficult.

The review of these successful appeal cases shows clearly the influence of the home on the child's attitude to education. In every case except two, because of strong parental encouragement, the pupils remained in some form of education beyond the statutory school leaving age.

CONCLUSIONS

There is a legal obligation upon Education Authorities to consult parents on the secondary courses which they wish their children to follow, although the Authorities must satisfy themselves that the pupils show reasonable promise of profiting from the course desired by the parents. The wishes of the parents are not always educationally sound, because a natural ambition for their child's welfare drives some of them to select courses which are well beyond the natural ability of their offspring.

There is little doubt that the influence of the home is reflected in a pupil's success at school and in the duration of his stay beyond the statutory school leaving age. The cultural home environment may be favourable or unfavourable; where it is favourable, a child's chances of success are increased and where it is unfavourable they are greatly lessened.

The positive or negative influence of the home cannot be accurately assessed, and it is certainly not determined by material conditions alone; encouragement to study is by no means in direct proportion to the economic status of the parents. It is difficult to suggest how this vital factor of home influence can be taken into account in allocating pupils to their appropriate secondary courses.

One other principle can be established. No matter how favourable the home influence may be, it cannot outweigh the disadvantage of lack of ability. It is a sad but inescapable fact that there are not a few children who do not have the mental ability which is necessary to undertake the training for a professional career yet whose parents have the praiseworthy ambition to see them earn their living in this way.

CHAPTER V

TEACHERS' ESTIMATES

EDUCATIONISTS generally would agree that the teachers who have been concerned with a pupil's education for seven years from the age of 5 to 12 years should have a better knowledge of his potentialities than any examination or series of tests. Any estimate of the pupil's attainment in a subject such as English or arithmetic should also be more comprehensive than any test or examination which is bound to be examining only a sample of his field of knowledge. Teachers' estimates of a pupil's ability, therefore, should be among the most efficient predictors of success in a secondary course.

The basic weakness of teachers' estimates, however, lies in the difficulty experienced by all primary school teachers of maintaining comparative standards. For example, the teacher from a school in an area where the parents are drawn largely from the professional classes will tend to give a pupil of IQ100 a low mark because he will appear to be so much below the normal pupil in the class. On the other hand, the teacher in an area which recruits more than its normal share of dull and backward pupils will tend to give a relatively high mark to a pupil of similar IQ because he appears to be a child of ability so much greater than the majority of his classmates. The order of merit in the two classes will be correct, but the standard of each teacher will in all probability be different.

McClelland pointed out, also, that teachers were generally optimistic or generous when estimating a pupil's chance of success in an external examination; the tendency to give the benefit of the doubt is a natural and exemplary characteristic of teachers.

Two forms of estimate were given by the teachers in the Fife promotion scheme—(*a*) the headteacher's recommendation of the course from which the pupil was most likely to benefit; (*b*) estimates of the pupil's attainment in English and arithmetic.

HEADTEACHERS' RECOMMENDATIONS

Headteachers were asked to give their own recommendations on the course from which they thought each pupil would derive the greatest benefit, taking into account their complete knowledge of the child. These recommendations were in the form of a straightforward classification—A, A(Com.), B1, B2 or Retain.

Headteacher and Board

The first inquiry was naturally into the extent to which the allocation made by the Board agreed with the recommendations of the headteachers, and this is given in Table XVI, in which A and A2(Com.) courses are taken together, since the same level of attainment was required for each.

TABLE XVI

BOARD'S ALLOCATION AND HEADTEACHERS' RECOMMENDATIONS

		Recommendations by Headteachers				Total
	Course	A	B1	B2	Retain	
	A	1,174	46	—	8	1,228
	B1	144	1,831	148	7	2,130
Allocation by Board	B2	—	53	963	11	1,027
	R	7	3	1	20	31
	Total	1,325	1,933	1,112	46	4,416

From Table XVI it can be seen that there is a large measure of agreement between the Board and the headteacher; indeed, in 90 per cent of the cases the Board's decision coincides with the headteacher's recommendation. In about 4 per cent the Board took a more optimistic view of the pupils' capabilities, and in about an equal number of cases they allocated the pupil to a lower course than that recommended by the headteacher. It should be kept in mind that it is difficult for the Board to adopt the headteacher's recommendation and to allocate a pupil to a B1 course against the wishes of the parent when that pupil has attained an AA of 75 or above: there were 22 such cases. Again, the Board can hardly admit to an 'A' course pupils with an adjusted average mark of 65–69 even when recommended for an 'A' course by the headteacher: there were 47 such cases.

At the 'A' pass mark, headteachers and Board disagreed to the extent of 190 pupils, 46 being upgraded and 144 being downgraded. At the 'B' pass mark, the tendency was in the opposite direction, the total disagreement being 201 pupils, with 148 being upgraded and 53 downgraded. Public concern is much greater with the decisions at the 'A' than with those at the 'B' pass mark.

Table XVI shows that the headteachers recommended that 1,325 or 30 per cent of the promotion group should be allocated to 'A' courses. This confirms the results of other inquiries that teachers tend to be generous or optimistic when estimating the probable success of their pupils. Parents naturally tend to be even more optimistic about their children's ability to profit from higher courses of education, and, as is shown in Chapter IV, it is a measure of their justifiable aspirations for their children's welfare that 39 per cent of them asked that their children be admitted to 'A' courses.

Board's Allocation to 'A' Courses against the Headteachers' Recommendations

The total number of cases in this category was 46. This number, however, included 12 cases of very able pupils whose parents were ultimately persuaded to re-consider their decision and allow the pupils to proceed to a high school and whose educational history was discussed in the section of Chapter IV entitled 'Against the Wishes of the Parents'. It might fairly be said that they ultimately entered the category Headteacher 'A'—Board 'A', and, therefore, there were only 34 cases in which the Board gave a higher recommendation than the headteacher.

Of the 34, only 2 remained beyond the statutory school leaving age, 1 reaching the Leaving Certificate stage. Their case histories were as follows:

Pupil 1013 (girl—AA 75). Had a success mark of 18 at the end of the third year. The headmaster reported, however, that she was struggling and had been transferred to a commercial course. In the Leaving Certificate examination she passed in English (L) and commercial (L) at the end of the fifth year, and left to become a shorthand typist.

Pupil 2369 (boy—AA 76). Had a success mark of 11 at the end of the third year and a success mark of 17 at the end of the fourth year. The Rector reported that he lacked the necessary natural ability and concentration. He left at the end of the fourth year to become an apprentice electrical fitter.

The majority of the other cases were pupils who had adjusted averages which were above the pass mark. Typical of these are:

Pupil 619 (boy—AA 76). In the first year the Rector reported that this boy was working hard and, although not doing quite so well in his second year, was still regarded as a good pupil. The report in the third year, however, stated that the course probably called for too much effort from him. He 'gave in' during the third year and left to become an apprentice motor mechanic.

The impression is given that he was a good type of boy, eager to do well, but found the course beyond his ability, although a mark of 13 per cent in French indicates that the course did not suit the ability and aptitude of the boy.

Pupil 935 (boy—AA 79). Was reported by the Rector as being 'not too reliable.' To the question whether the course suited the pupil's ability and aptitude, the Rector replied 'Ability—yes; industry—no.' With a success mark of 9 at the end of the third year, he left to become an apprentice electrician.

In these two cases the primary headteacher realised that there was little chance of the pupils making a success of a high school course. In the first case, the boy lacked the ability but had a good home background and a good character; in the second, the boy had the necessary ability but lacked the necessary character qualities. Both, however, had scored above the pass mark, and the parents of both wished a high school course; it appears that there was little else the Board could do but recommend these pupils to follow a high school course.

A few of the cases had adjusted averages which were just below the pass mark. In the main, they were girls whose parents put in a special plea for their daughters' admission to a commercial course. The following cases are illustrative of 'failure' and 'success' as judged by the success marks at the end of the third year:

Pupil 122 (girl—AA 74). This girl was placed in a three years commercial course and had a success mark of 10 at the end of the third year. She left school for a post as a draper's assistant.

Pupil 1914 (girl—AA 73). Enrolled in a commercial course, but by the third year was finding difficulty with some of the subjects. She returned to school to repeat the third year, at the end of which she had a success mark of 20. She left school to become a shop assistant

The impression is gained from a study of individual cases that the headteacher's judgment was generally sound. It is difficult, however, for a Transfer Board to refuse to allocate a pupil to a high school course when the parent desires this course and the pupil's adjusted average is above the pass mark. Nor is it easy to assess whether a pupil's attendance at high school has been worth while, even though a pupil does not reach the Leaving Certificate stage. The case of Pupil 1,013 mentioned above, who continued at school for five years, illustrates this point. It would be wrong to judge this pupil's success in her course by her performance in the Scottish Leaving Certificate examinations. Her worth as a shorthand typist would benefit considerably by the English curriculum which she studied.

Those who work with promotion schemes know full well that not only must they be just but they must also appear to be just if they are to have the confidence of the society which the educational system serves.

Allocation to 'B' Courses against the Headteachers' Recommendations

One hundred and forty-four pupils who were recommended for 'A' courses by the headteachers were allocated to 'B' courses by the Board. The distribution of their AAs was as follows:

AA	*Frequency*
75–79	4
70–74	93
Below 70	47
Total	144

The 4 pupils whose AAs were above the pass mark were allocated to 'B' courses because their parents were unwilling to allow them to enrol in an 'A' course. As both 'A' and 'B' courses were provided in the schools to which these pupils were being transferred, the headteachers hoped that the parents might be persuaded to change their minds, but the parents remained adamant. All 4 pupils did well in their 'B' courses; 2 of them continued in full-time education in a pre-apprenticeship catering and bakery course, and the other 2 entered the mining industry, where there are many opportunities for further education.

Of the 140 pupils below the pass mark allocated to 'B' courses against the headteachers' recommendations, 19 appealed for and were granted a transfer to an 'A' course because of their standard of attainment in the particular secondary course to which they had been allocated. So important is the transference of pupils from one course to another that a special chapter is devoted to a study of it (Chapter IX).

It is perhaps sufficient at this stage to indicate that 3 of the 19 sat the Leaving Certificate examinations and gained a certificate with passes in certain subjects. One or two struggled to the fourth year before admitting defeat, while the others found the going difficult from the start and left school soon after reaching the statutory school leaving age. Typical of these is the following:

Pupil 965 (boy—AA 72). This boy was transferred to an 'A' course after one year in a 'B' course. He had to repeat the first year in the high school course and left at the end of the second year. In his report the Rector stated that any success which he had achieved had been at too great a cost in nervous effort. 'Parents too anxious and pushing the boy hard at home until he is becoming a nervous wreck.' He left school to become a clerk.

In the large majority of cases where the pupil's AA is below the pass mark, the Board appear to have been justified in not accepting the headteachers' recommendations, and in those cases where the pupil did show aptitude for academic study, he was given an opportunity of transferring to a high school course.

RETENTION IN THE PRIMARY SCHOOL

McClelland in the Dundee investigation tentatively concluded that the system of retaining pupils for six months is valuable in certain cases, but he recommended that retention for one year be resorted to only in exceptional cases and that retention for longer periods be abandoned. The adoption of these recommendations ensures that large numbers of less able children are not retained in the primary school beyond the age of 12 years. Such retention is educationally unsound and reflects the old idea of the qualifying examination as a hurdle to be cleared before admission to secondary education can be undertaken with profit.

The objectives of the McClelland recommendations can be largely attained by the 'clean-cut' system which is a feature of the Fife promotion scheme. It ensures that most primary school children are transferred to secondary courses specially designed for their educational needs at about the age of 12 years. Furthermore, the operation of such a system results in the majority of pupils receiving three complete years of secondary education.

In the Fife promotion scheme there are no definite instructions regarding the type of pupil for whom retention may be granted, although there is a general understanding that pupils who, for some reason such as illness, have not had the normal period of primary education may be granted retention. Headteachers sometimes recommend for retention for six months a pupil who has just failed to reach the pass mark, especially if the parents are very anxious that their child should take a high school course; where such a child is below 12 years of age, the Board tend to give favourable consideration to his case. As a general rule, however, those pupils who have just failed to reach the pass mark and whose education has not been interrupted are encouraged to proceed to secondary courses and if, after six months or a year, their progress suggests that they might benefit from a higher course, they are automatically transferred to such a course. There is evidence to show that the standard of attainment in arithmetic tends to decline once the regular daily drill to which they are subjected in the primary school is discontinued and, therefore, it would be unfair to make such pupils sit promotion tests.

Pupils presented for promotion in September and who are retained cannot begin their high school courses until the following September because such courses commence only once a year. Retention for pupils in the February group does not in practice result in any loss of time; pupils in the February group allocated to 'A' courses have to enrol in a preparatory class and start on their course proper in September.

Thirty-one pupils (13 boys and 18 girls) or 0·7 per cent of the total promotion group were recommended for retention by the Transfer Board; this compares with the retention of 10·6 per cent of the Dundee inquiry group. Thirteen of the retained pupils, with an average age of 11 years 9 months, were in the February group; and 18, with an average age of 11 years 7 months, in the September group.

Only 1 of the 31 pupils who were retained did not improve his AA on second presentation; the AA of this pupil fell from 71 to 70. The average improvement in AA of all retained pupils was 4·2. One pupil increased his AA by 17, but he had come from abroad and had not at the time of first presentation had sufficient schooling to enable him to reach the standard in English and arithmetic expected of Scottish children of this age; his natural ability, however, enabled him in the six months period to increase his AA from 63 to 80, and retention was therefore clearly to his educational advantage.

The opposite table shows the results of the second presentation of the 31 candidates who were retained:

Four of the 15 pupils who succeeded in reaching the pass mark for high school courses followed commercial courses and on leaving school took up commercial appointments. One of these had remained for a fourth year, taking an intensive commercial course, and subsequently entered employment in a bank.

TABLE XVII

RESULTS OF SECOND PRESENTATION OF RETAINED PUPILS

		Parent		Total
		A	B1	
Board	A	15	—	15
	B1	8	5	13
	Left Fife	2	1	3
	Total	25	6	31

Seven were enrolled in one-language courses. Of these, 1 continued to the fifth year and took a Leaving Certificate with three lowers (English, history and geography). Three completed only a three years' course, but were not regarded as able leavers, although 2 of them continued in full-time education, 1 at a pre-nursing school and another in a pre-apprenticeship engineering course. Two left school before completing three years of the course, and 1 transferred to a B1 course after one year, subsequently, however, enrolling in a pre-apprenticeship engineering course.

Four undertook two-language courses. One completed three years, finishing the course with a success mark of 16, and entered employment as a shop assistant. The boy who had come from abroad and who showed such a marked improvement in the second presentation found the course difficult all through school and was finally advised to leave in his fourth year. One girl continued at school, re-sitting her third year, and was presented for the Leaving Certificate in her sixth year. The fourth provides an excellent example of the parents' ambitions running counter to the educational wellbeing of the child. This pupil was 11 years 10 months when he was first presented for promotion, his AA was 72, and on a strong appeal from parent and headmaster he was retained for a second presentation, increasing his AA to 79. As his first presentation was in September, he had to enrol for six months in a preparatory class before he started on his high school course at the age of 12 years 10 months. Again, thanks to the parents' insistence, he was allowed to undertake a course which included the study of French and Latin. The headmaster's comments on his first year's progress were that he had done remarkably well. At the end of the second year the school report indicated that there were some doubts about his successfully completing the course and that he was continuing at too great a cost in nervous effort: the obvious step was taken of transferring him to a one-language course. In the third year, the school report stated that he was being pushed too hard at home and was 'rapidly becoming a nervous wreck'. It was pointed out to the parent that the child would never complete the Leaving Certificate course, and he left school to become a clerk.

The 8 pupils who were refused 'A' courses all did well in their secondary school. One in particular was so successful that the parent appealed for a transfer to a high school course after one year. This was granted and the pupil did extremely well, gaining a certificate with English (H), music (H), history (L), French (L) and art (L). Confirmation that her high school course was successfully completed was obtained from her headmaster who not only reported favourably on her scholastic progress, but also pointed out that she had been made a prefect in the school. Being especially talented in music, she intended to enrol in a College of Music.

All 5 pupils who had been retained for 'B' courses made reasonably good progress throughout their school careers, although because of retention only 2 were able to complete three years of their secondary course.

The most frequent appeals for retention come from parents whose children have just failed to reach the pass mark for high school courses. From a review of the 23 cases in which the appeal for retention from parents who wished an 'A' course was granted, it is evident that those who are successful on their second presentation rarely complete a high school course to the Leaving Certificate stage. Indeed, the most successful pupil of the 23 was one who did not succeed on the second presentation, but was ultimately transferred to a high school from a junior secondary course.

There are good grounds for the conclusion that retention should be granted only in exceptional cases where a child's normal educational career has been interrupted for some reason such as illness.

ESTIMATES IN ENGLISH AND ARITHMETIC

The volume of research on the examination of examinations is considerable, yet there are still many who are concerned with the setting and marking of examinations who appear to be blissfully unaware of the unreliability of their marks. Even where the marks are reliable, only by chance are the standards of marking of several examiners comparable. This fact is not yet fully appreciated.

Suppose, for example, teacher 'A' submits a set of estimates which have a mean of 60 and a standard deviation of 10, while teacher 'B' gives estimates with a mean of 50 and a standard deviation of 20. An estimate of 80 from teacher 'A' places a pupil much higher in the class order of merit than the same estimate from teacher 'B'. Again, an estimate of 40 from teacher 'A' places a pupil much lower in the class order of merit than the same mark from teacher 'B'. The standard of marking represented by the mean or average and the scatter of marks represented by the standard deviation determine the relative 'weight' of a mark.

There can be little doubt that teachers' estimates from different schools lose much of their value if steps are not taken to ensure that the mean and standard deviation of the marks are adjusted to some objective standard: this is done by scaling.

Scaling

The following illustration may help to convince those who are sceptical about the necessity for scaling:

Figure 9 shows five marks from each of two sets of estimates. From School 'A' the unscaled estimates are 87, 82, 77, 72 and 67, and are represented by circles on the left-hand side of the diagram. From School 'B' the five selected marks are 70, 60, 50, 40 and 30, and are represented by rectangles on the

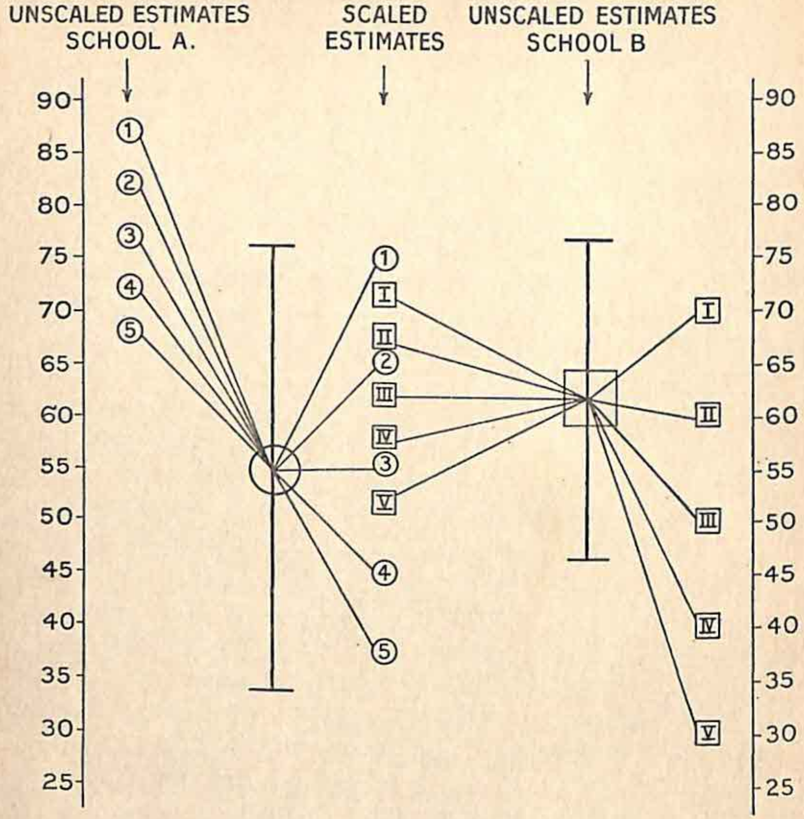

FIGURE 9 The Scaling Operation

right-hand side of the diagram. All pupils in each school sat an objective test with the following result:

School 'A'—mean 55, sigma 7
School 'B'—mean 62, sigma 5

It must be clearly understood that these results are for *all* pupils in School 'A' and not for the 5 selected pupils. These results are represented diagrammatically by a large circle and a large rectangle for the position of the means for School 'A' and School 'B' respectively and vertical lines for the scatters. When each set of estimates is scaled and the scaled estimates placed in order in the middle of the diagram, it is clearly seen that a completely new order of the ten marks has resulted. The unscaled and scaled orders are as follows:

Unscaled—	1	2	3	4	I	5	II	III	IV	V
Scaled —	1	I	II	2	III	IV	3	V	4	5

The correlation between the two orders is 0·34.

This illustration should make it quite clear that if unscaled estimates are used, there might quite well result gross unfairness to certain pupils. In the above example pupils from School 'B' would be unjustly treated.

An actual result will perhaps carry even greater weight. Three groups of children, amounting to 41 pupils in all, were sent from different primary schools to one of the high schools. The mean and standard deviation of the estimates and the standardised objective test marks in arithmetic of each group were as follows:

	Estimate		*Mark*	
School	*Mean*	*Standard Deviation*	*Mean*	*Standard Deviation*
P	63·5	16·2	68·0	12·4
N	71·0	17·8	76·6	17·8
B	61·7	11·3	70·6	9·62

It can be seen that the standard of estimating in the schools does not correspond to the attainment in the objective test; the order of the schools for the estimates is N, P, B, while for the objective test it is N, B, P. The scatter of the estimates and marks in school N is the same, while for schools P and B the estimates are more widely scattered than the corresponding marks in the objective test.

Consider the unscaled and scaled estimates of three pupils X_P, Y_N, Z_B, one from each of the three schools, P, N and B respectively. The following table shows the unscaled estimate and rank each held among the 41 pupils, and the estimate and rank after these estimates had been scaled:

	Unscaled		*Scaled*	
Pupil	*Estimate*	*Rank*	*Estimate*	*Rank*
X_P	85	20	91	13
Y_N	87	11	86	$22\frac{1}{2}$
Z_B	80	28	86	$22\frac{1}{2}$

The order of merit has considerably changed after scaling. If, for example, the first 15 pupils from the 41 were to be selected on the basis of their arithmetic estimates, pupil Y_N would be chosen when the unscaled estimates were used, but this choice would have been unfair to pupil X_P, who would have been included in the first 15 when the scaled estimates were used.

The necessity for using the scaling process in allocating pupils to secondary courses should be obvious.

Scaling in Practice

The scaling of teachers' estimates from a large number of schools can be accomplished by clerical staff under skilled supervision. An outline of the techniques employed are given in *The Scaling of Teachers' Marks and Estimates** and need not be repeated here. As several improvements in technique have been devised, it is hoped to publish a revised edition of this publication which will include a section dealing with scaling for small schools, but it is perhaps desirable to add a note on this subject here.

Scaling for Small Schools

One of the difficulties in scaling teachers' estimates for all types of schools is met when the number of pupils is so small that the mean and standard deviation are not valid measures of the standard and scatter of the marks. A way of overcoming this difficulty when the number of pupils lies between 6 and 12 has been devised, and while it is not proposed to deal with this topic at length in this book, an indication of the method of solving the problem is given. The explanation is perhaps best given by an illustrative example.

School X submitted 5 pupils whose estimates and standardised marks in English were as follows:

Pupil	*Estimate*	*Standardised Mark*
1	55	53
2	75	76
3	35	50
4	55	62
5	30	64

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* *The Scaling of Teachers' Marks and Estimates*, McIntosh, Walker and Mackay, Oliver & Boyd, 1949.

These estimates and Marks are plotted against each other as in Figure 10.

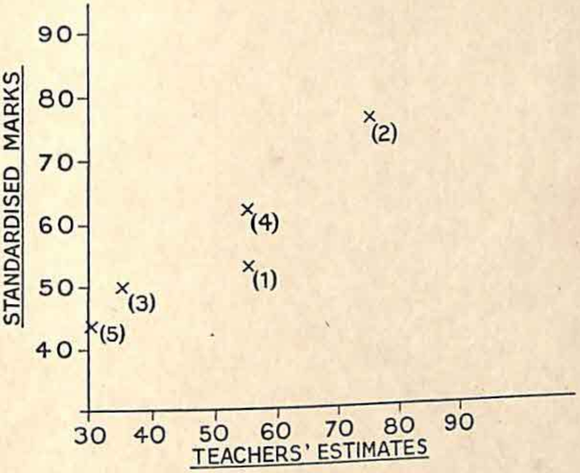

FIGURE 10 Estimates and Marks from Small Schools

It will be seen that these points, with the exception of (1), lie roughly along a straight line and are therefore related to each other in some way. If no clear relation is visible, the estimates cannot be reliably scaled.

The point (1) in the figure is called a 'flop' score. A 'flop' score is one which is more than ten marks below its appropriate place on the line fitting the remaining points. A circle is placed round the estimate and mark, and these are omitted from the calculations.

The average of the estimates and marks are calculated and indicated on the graph by point O. Through O is drawn the line best fitting the points (see Figure 11).

From this line is read off the mark corresponding to each estimate: this mark is the scaled estimate. Scaling is applied to all estimates, including those where the candidate has made a flop score.

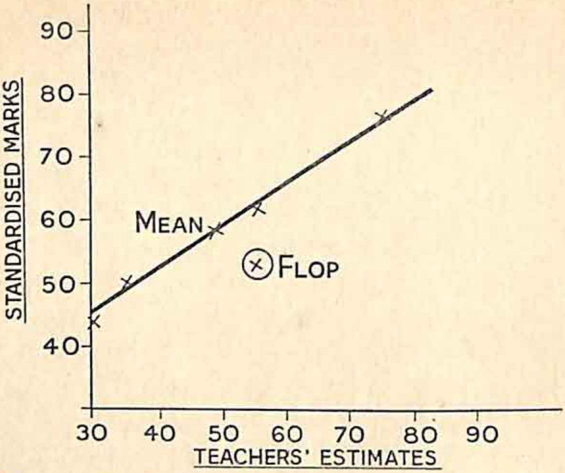

FIGURE 11 Scaling Estimates from Small Schools

Pupil	*Estimate*	*Mark*	*Scaled Estimate*
1	(55)	(53)	(62)
2	75	76	76
3	35	50	49
4	55	62	62
5	30	44	45
Total	195	232	232
Average	49	58	58

The scaled estimates are entered in a column alongside and flop scores are circled. A check on the accuracy of the scaling is obtained by finding the sum of the scaled estimates (ignoring circled entries) and comparing with the sum of the marks. The totals must not differ by more than the number of candidates.

URBAN AND RURAL SCHOOLS

In Scotland some 43 per cent of the schools are one, two or three teacher schools. There is evidence that the level of intelligence of the pupils in the rural schools is not lower than that in the urban areas, but the fear is sometimes expressed that the teacher's task in the rural school is so difficult that the pupil's attainment cannot reach the same standard as the child in the urban school where classes are homogeneous and there is the spur of competition.

It is not possible for the promotion scheme to function completely in the small school because the teachers' estimates cannot be scaled when there are only one or two pupils being presented. McClelland recognised this difficulty and suggested that in rural areas small adaptations might have to be made to the pass mark. It was possible to study this problem and, although space does not permit the full investigation to be reported here, some of the results are worth recording.

Two hundred and seventy-two pupils from the one, two and three teacher schools were paired with pupils of equivalent IQs from urban schools. The means and standard deviations of the test results of the two groups were as follows:

	Pupils from 1, 2 *and* 3 *Teacher Schools*		*Pupils from Urban Schools*	
	Mean	*Standard Deviation*	*Mean*	*Standard Deviation*
IQ	97·7	13·8	97·7	13·8
Qe	61·6	12·6	62·8	14·6
Qa	59·6	13·2	62·8	14·4

The means of the Qa's are significantly different, whereas the difference between the mean Qe is not significant. Pupils in rural schools apparently do not reach the same standard in arithmetic as pupils in urban schools.

When the pupils were classified according to their secondary courses, the mean scores in the arithmetic test were as follows:

	Course		
	A	B1	B2
Rural	76·3	61·9	45·8
Urban	81·9	65·2	47·3
Number of pupils	47	145	80

The mean Qa's of the A and B1 pupils in rural schools are both significantly higher than the mean Qa's of the corresponding pupils in urban schools. Since the mean Qa's of the B2 pupils are not significantly different, it would appear that the less able pupils are not affected by the different conditions to the same extent.

When the arithmetic scores of the 47 pupils allocated to 'A' courses are further analysed into their problem and mechanical components, the following result is obtained:

		Rural	*Urban*	*Difference*
Mechanical	Mean	27·11	30·62	3·51
	Standard Deviation	5·29	4·63	S at 5%
Problem	Mean	24·93	27·42	2·49
	Standard Deviation	5·77	5·27	NS

The difference between the mean scores of the rural and urban children in the mechanical section is significant, whereas the difference between the scores on the problem section is not significant. It is fair to conclude that it is chiefly in mechanical arithmetic that the rural child has a lower standard of attainment than the urban child. This is readily understood because conditions in the urban school, with its homogeneous classes, allow for much more drill than is possible in the country school where many stages are taught in the same classroom.

One further result is of interest. As far as AAs can be determined for the small schools, the correlation between them and S3 is 0·454 for the rural school and 0·554 for the urban school. The implication behind these correlations is that prediction is less efficient for the child from the rural school than from the urban school.

McClelland's recommendation that the rural child be given special consideration is confirmed by the Fife data.

STANDARD OF ESTIMATES

In the example quoted on page 91, it will be noted that the standardised objective test results have, for each of the three schools, a higher mean than the teachers' unscaled estimates. The result of scaling in each case is to increase the teachers' unscaled estimates. This holds for the majority of the schools and indicates that the teachers operating this promotion scheme are not over-generous in their numerical estimates.

In direct contrast, however, are the headteachers' general estimates of the pupils' success, which were shown on page 80 to be over-optimistic. This is an important finding, because McClelland's conclusions were based upon estimates of success in the Leaving Certificate examinations submitted by the head-teachers at the end of the third year, and may therefore have given a pass mark which is lower than would have been obtained if actual Leaving Certificate results had been available.

TEACHERS' ESTIMATES IN ENGLISH

Relationship with Battery Measures

The correlation coefficients between Tes and the other battery measures for the February and September groups are as follows:

	Group	
Measure	*February*	*September*
AA	·949	·953
IQ_1	·869	·879
IQ_2	·881	·883
Qe	·914	·917
Qa	·829	·842
Tas	·869	·885

The coefficients are all high, which is not necessarily to the advantage of successful prediction, because it may mean that the teachers' estimates in English are measuring the same abilities as the other measures. This holds particularly for Tes and Qe which are very highly correlated. The smallest coefficient is with Qa and the highest with AA.

Correlation with Success

The correlation between the teachers' estimates and the general success marks in high schools declines slightly in size from third to fifth year and increases to its highest level in the sixth year; this is illustrated in Figure 1. Of the individual measures Tes gives the highest correlation with success in the third and sixth years, and takes second place to Qe along with IQ_1 for the fourth and fifth years. Tes is the best individual measure for predicting success in the individual subjects of the Leaving Certificate on the higher standard after six years; this includes mathematics and science, success in which tends to be least predictable by the battery measures.

In the junior secondary school where the measures of English tend to be the least effective predictors of success, Tes has only a slightly higher predictive value than Qe.

Clearly, the scaled teacher's estimate in English is an indispensable part of any scheme for allocating pupils to secondary courses of instruction, and is particularly useful in predicting success in courses which have a literary character.

TEACHERS' ESTIMATES IN ARITHMETIC

Relationship with Battery Measures

The correlations between Tas and the other battery measures for the February and September groups are as follows:

	Group	
Measure	*February*	*September*
AA	·926	·935
IQ_1	·806	·820
IQ_2	·843	·842
Qe	·804	·817
Qa	·925	·929
Tes	·869	·885

As in the case of the English estimates, all the coefficients are high. There is a very high degree of relationship between the teachers' estimates in arithmetic and the performance of the pupil in the objective test in the subject; indeed, there appears to be the possibility that some teachers attempt to forecast what the pupil will achieve in the test rather than a general estimate of the pupil's ability in the subject. The smallest degree of relationship is with the English test results.

Correlation with Success

Figure 1 shows that there is a tendency for Tas to decrease in its predictive value of high school success from the third to the sixth year and that, along with Qa, it is the least efficient predictor of the battery measures, although it must again be emphasised that the correlations are high when compared with the correlations established in other follow-up investigations.

For individual subjects the teachers' estimates in arithmetic are a little less efficient predictors of achievement in the Leaving

Certificate examinations on the higher grade in the sixth year than the intelligence tests, although the latter appear to have a higher predictive value for subjects such as English, French and Latin in the fifth year. On the other hand, teachers' estimates in arithmetic appear to predict success in the junior secondary school more effectively than any of the other individual measures in the battery. This would indicate that they have a special value in forecasting the probable attainment of pupils in courses in which practical subjects play a prominent part.

Teachers' scaled estimates in arithmetic serve a useful purpose in allocating pupils to secondary courses, particularly those in which there is a large proportion of time given to subjects with a practical bias.

Summary and Conclusions

Headteachers' recommendations and numerical estimates in English and arithmetic are the two forms of teachers' estimates generally used to provide some of the evidence on which a final decision is reached on the secondary course from which a pupil is most likely to profit. Both are necessary, and each has a relatively high predictive value.

The headteachers' recommendations tend to be generous. It is natural for the teacher to give a pupil the benefit of the doubt, particularly where the parent is anxious for the child to be admitted to a high school course; generosity sometimes overrules judgment, even when the evidence is indisputable. In the instance where the pupil is promoted to a high school course against the headteachers' recommendation, success is unlikely. Recommendations for a further period in the primary school are justified only where the pupil has not been able to take full advantage of the primary school course; retention should be granted only in exceptional circumstances and then for a period of six months. It is preferable in the large majority of cases for the pupil to proceed to the secondary school and transfer to a more arduous course if his progress warrants such a change.

Numerical estimates in English and arithmetic must be scaled, the English estimates on the English test results and the arithmetic estimates on the arithmetic test results. The English estimates tend to be better predictors of success in courses in which the curriculum has a literary bias, whereas the arithmetic estimates appear to have a special value for predicting success in courses where the curriculum has a substantial proportion of the time allocated to practical subjects. In small schools where it is impracticable to scale the teachers' estimates because of the small number of pupils, the pupils should be given special consideration.

CHAPTER VI

THE TESTS

INTELLIGENCE TESTS

THE standardised group intelligence test, developed largely by Sir Godfrey Thomson with the express purpose of giving every child an equal educational opportunity, has become one of the storm centres of the controversy on selection for secondary education. The large volume of research on this topic has shown that such a test is one of the best individual measures for predicting success in academic courses and that its predictive value increases throughout the secondary school.

Despite its high reliability, however, it is inadvisable to use the results of a single test for allocating pupils. In the Fife scheme there is ample provision for safeguarding the child against his being labelled with an IQ which is contrary to all other evidence of the child's innate ability.

Relationship with other Tests

Table XVIII gives the inter-correlations of IQ_1 and IQ_2 with the other measures in the battery. As the tests for the February and September groups were different, it was necessary to calculate the correlations for each group separately.

Table XVIII shows that the intelligence tests are highly related with the other measures, particularly with the adjusted average; Qa, it should be noted, shows the least relationship with the IQs.

Predictive Value

In Chapter III it was shown that the intelligence test results do have a relatively high relation to the success marks, and that there is a general rise in their predictive value throughout the

TABLE XVIII

CORRELATION BETWEEN IQ_1 AND IQ_2 AND OTHER BATTERY MEASURES

Measure	IQ_1 February	IQ_1 September	IQ_2 February	IQ_2 September
AA	·923	·929	·943	·937
Qe	·861	·864	·869	·859
Qa	·788	·805	·826	·824
Tes	·869	·879	·881	·883
Tas	·806	·820	·843	·842

secondary school except for the sixth year results, for which all the measures except Tes and AA have a smaller predictive value. It is safe to conclude that the battery would be less effective for predicting high school success if the IQs were not included.

The intelligence test has also a contribution to make in predicting the performance of pupils in the junior secondary school. It tends, however, to have a lower value than with the high school results, indicating perhaps that its greatest asset lies in selecting pupils for a curriculum which is predominantly literary in character.

OBJECTIVE TESTS IN ENGLISH

The tests are in two sections, one section dealing with interpretation and the other with language usage. The relative weights of the marks for the two sections in the February tests were equal, but as a result of an investigation by the English panel, it was altered to 7:5 in the September test, a ratio which has been preserved in later forms of the tests.

The total test scores were standardised to make their distribution normal with a mean of 65 and a standard deviation of 15.

Relationship with other Tests

Table XIX shows the correlations with the other battery measures.

TABLE XIX

Correlation Between Qe and other Battery Measures

Measure	February	September
AA	·929	·929
IQ_1	·861	·864
IQ_2	·869	·859
Qa	·791	·807
Tes	·914	·917
Tas	·804	·817

Table XIX shows that the English test results correlate most highly with the AA. They are also highly correlated with Tes, which suggests that teachers' estimates in English tend to measure the same abilities as the English objective test. The lowest degree of relationship is with the measures of arithmetic, Tas and Qa, from which it may be concluded that different fields of knowledge or different abilities are measured by tests of English and arithmetic.

Predictive Value

The English objective test in the form used in this inquiry is one of the best predictors of success in the high school: it is superior to the intelligence test. A test of this nature, it should be remembered, is essential for the scaling of teachers' estimates in English. Few would deny that these estimates are an essential part of any scheme for allocating pupils to secondary courses and, therefore, as these estimates must be scaled, the English test should always be an essential part of a test battery. It earns a place in the battery not only on its own merits as a good predictor but also as a necessary vehicle for scaling teachers' estimates in English.

In complete contrast, the English test is relatively the least efficient predictor of success in the junior secondary school. This may be due to the dominant place in the junior secondary curriculum given to practical subjects. Confirmation of this might be adduced from the position of the correlation of Qe with passes in mathematics and science at the Leaving Certificate stage relative to its correlation with English, French and Latin; Figures 1 and 2 demonstrate this point clearly.

Interpretation and Language Usage

A further minor inquiry was made to discover whether one section of the test had a better predictive value than the other. As different tests were used for the February and September groups and as the results of the sections were not standardised, the correlations with success marks had to be worked separately for each group. Two large high schools were selected, designated Schools X and Y, and the correlations for each section of the English test calculated with S3. These correlations are given in Table XX and are uncorrected for restricted range: the number of pupils involved in School X was 92 in February and 116 in September; and in School Y, 87 in February and 188 in September.

TABLE XX

CORRELATION BETWEEN SECTIONS OF ENGLISH TEST AND THIRD YEAR HIGH SCHOOL SUCCESS MARKS

Section of Test	School X February	School X September	School Y February	School Y September
Interpretation	·378	·518	·231	·465
Language usage	·347	·470	·337	·515

It would appear from these correlation coefficients that there is no clear indication that one section of the test is a better predictor than the other. One advantage, however, of the section on interpretation is that it would be difficult to conceive a method of coaching which could improve a pupil's performance.

Conclusion

A test in English of the nature used in the battery with one section on interpretation and another on language usage is one of the most powerful predictors of success in a curriculum which is predominantly literary in character.

OBJECTIVE TESTS IN ARITHMETIC

There were two sections in the test, dealing with problem and mechanical arithmetic respectively, each section being awarded the same number of marks. Later forms of the test gave a greater number of marks to the problem section.

The total arithmetic test scores were standardised in the same manner as the English test scores.

Relationship with other Tests

Table XXI shows the correlation coefficients with the other battery measures.

TABLE XXI

CORRELATION BETWEEN QA AND OTHER BATTERY MEASURES

Measure	February	September
AA	·914	·919
IQ_1	·788	·805
IQ_2	·826	·824
Qe	·791	·807
Tes	·829	·842
Tas	·925	·929

Table XXI indicates that the test results correlate most highly with Tas, in this instance even more highly than with AA; clearly, the teachers' estimates and the objective test are measuring largely the same ability.

Predictive Value

As a predictor of high school success, Qa is relatively the least efficient of the battery measures, although the coefficients are as high as those found by McClelland. On the other hand, it takes a higher place when predicting success in mathematics on the higher standard in the Leaving Certificate examinations in six years. This would appear to indicate that it has a value in measuring that part of the curriculum which requires what might be described as mathematical ability. It therefore plays an important part in a test battery.

Qa has a much more important part to play in forecasting a child's attainment in the junior secondary school, particularly when the curriculum, as in the case of School Y, is biased towards mathematics and physical science.

Mechanical and Problem Arithmetic

Results were obtained from the two schools, X and Y, in a manner similar to that used with the sections of the English test. Table XXII gives the correlations between the mechanical and problem sections of the test and S3.

TABLE XXII

CORRELATION BETWEEN SECTIONS OF ARITHMETIC TEST AND THIRD YEAR HIGH SCHOOL SUCCESS MARKS

	School X		School Y	
	February	September	February	September
Mechanical	·164	·376	·291	·125
Problem	·299	·479	·237	·421

From Table XXII it would appear that there is a tendency for the mechanical section to be a less efficient predictor of high school success than the section dealing with problems.

It is not possible without further research to establish whether the test requires modification or whether the teaching in the schools needs careful consideration. Mechanical arithmetic is one of the subjects on which Scottish teachers in the primary schools exert their greatest efforts, a tradition which has been established perhaps because of the ease with which the results of teaching can be assessed. On the other hand, there is not a general awareness of the fact, established by research, that the loss of learning is considerable. It may well be that the teaching of arithmetic requires careful investigation for there may be greater concern with a high level of attainment, which can be readily lost, than in establishing concepts of number, space and quantity.

Conclusion

Of the battery measures the arithmetic test is one of the least effective predictors of general success in the high school, although it is among the best predictors of success in Scottish Leaving Certificate mathematics after six years. On the other hand, the arithmetic test follows closely on the teachers' estimates in arithmetic as being the best predictor of success in the junior secondary school. It would, therefore, appear that the arithmetic test is an essential part of the test battery for allocating pupils to secondary courses.

Further research is required into the construction of arithmetic tests for the purpose of allocation, particular attention being paid to the section on mechanical arithmetic. Research is also necessary into the methods of teaching arithmetic in Scottish primary schools.

WEIGHTING

The relative weights or influence of several sets of marks, when combined to form a total mark, are not readily determined.

It is generally known that the possible marks of each test have little or no bearing on the influence of each set of marks on the total. For example, if Qe and Qa are combined to give a total mark Q and the possible marks of Qe and Qa are 200 and 100 respectively, it is most unlikely that the weight of Qe is double the weight of Qa.

It is often suggested that the relative weights of several sets of marks when combined are proportional to their standard deviations. This commonly advised method only gives equal weights under special circumstances, namely, when the several tests are mutually equally correlated. It might be assumed, for example, that since each of the six tests which go to form the AA has a standard deviation of 15, they have the same weight; this is not necessarily the case.*

One definition, 'and possibly the most meaningful as applied to tests, is that the parts have equal weight when they are equally related to the total score'.* Accordingly, if the influence of each test which goes to form the AA is to be the same, the correlation coefficient of each test with the AA should be of the same magnitude.

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* (*a*) Wilks, S S 'Weighting Systems for Linear Functions of Correlated Variables when there is no Dependent Variable', *Psychometrika*, vol iii, No 1, March 1938.

(*b*) Gulliksin, H *The Theory of Mental Tests*, chap xx, 'Problems of Weighting Differential Prediction', Wiley & Sons, 1950.

The correlation coefficients between each measure and AA are given in Table XXIII.

TABLE XXIII

CORRELATION BETWEEN BATTERY MEASURES AND AA

Group	IQ_1	IQ_2	Qe	Qa	Tes	Tas
February	·923	·943	·929	·914	·949	·926
September	·929	·937	·929	·919	·953	·935

From the above table it can be seen that the coefficients are all of the same order, and hence it may be assumed that the relative weights of the tests are equal.

ANALYSIS OF TEST BATTERY

(The reader whose interest lies outside the field of statistics can safely omit all but the last paragraph of this section.)

The principle behind the construction of a test battery which will predict success in the secondary school is that each test should measure an ability or group of abilities which contribute to the successful study of the secondary school curriculum. There is no point in including two tests which measure exactly the same ability. In practical terms, the tests should be related to each other as little as possible but each should be highly correlated with the criterion. This is difficult to achieve; for example, the intelligence tests and the English test cannot avoid being dependent on the ability to read.

Factorial analysis, developed largely by Spearman, Thomson, Burt and Thurstone, is a mathematical device which analyses a body of correlations provided by the same group of subjects in different tests. It aims to investigate those influencing causes

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* Stalmaker, J M 'Weighting Questions in the Essay Type Examination', *Journal of Educational Psychology*, vol xxix, October, 1938, No 7.

(factors) which lead to the inherent pattern of the inter-correlations. The various inter-correlations may be set out as follows:

	IQ_1	IQ_2	Qe	Qa	Tes	Tas
IQ1		·915	·861	·788	·869	·806
IQ2	·915		·869	·826	·881	·843
Qe	·861	·869		·791	·914	·804
Qa	·788	·826	·791		·829	·925
Tes	·869	·881	·914	·829		·868
Tas	·806	·843	·804	·925	·868	

These inter-correlations have already been studied for each individual test and certain conclusions have been tentatively reached:

(*a*) The inter-correlations are all high, and it may therefore be concluded that there is a strong tendency for all the tests to measure the same ability or group of abilities.

(*b*) The measures of the same subject are very highly related. The two intelligence tests, the English test and the teachers' estimates in English, and the arithmetic test and the teachers' estimates in arithmetic appear to measure an almost identical ability or group of abilities.

(*c*) The least relationship appears to be between the arithmetic test and the tests of intelligence and English, the latter two appearing to cover much the same ground. It might be deduced that the arithmetic test and estimates measure a different ability or group of abilities from that measured by the other test.

(*d*) The teacher's estimates are also highly related. In this connection it is generally known that the pupil successful in one subject is generally successful in most of the subjects of the primary school curriculum. There may be a 'halo' effect in assessing attainment in different subjects in the primary school.

By the method of centroid analysis,* the following factors were established:

	Factors				
	I	II	III	IV	h^2
IQ1	·9217	−·1776	·1453	−·0447	·9042
IQ2	·9406	−·1281	·1494	−·0906	·9317
Qe	·9216	−·1775	−·1312	·0115	·8982
Qa	·9059	·2788	·0102	−·0579	·9018
Tes	·9453	−·0978	−·1718	−·0845	·9398
Tas	·9268	·2706	−·0295	−·1354	·9514

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* Method described by F F Medland in *Psychometrika*, vol xii (1947).

Factor I.—This factor operates largely in each test, and it may therefore be concluded that all the measures cover the same ability or group of abilities.

Factor II.—This shows again what an inspection of the intercorrelations indicated, namely, that the IQs, the English test and estimates are very closely aligned, and that the arithmetic test and estimates are similarly related. Here there is a clear indication of a numerical as opposed to a purely verbal ability.

Factors III and IV.—It is very doubtful whether any sound interpretation of these factors can be made.

The mathematical analysis does not give much more information than can be deduced from a study of the correlations. Clearly, the present tests in the battery tend to measure the same ability or group of abilities, and the most hopeful line of advance may be in the modification of the arithmetic test and estimates.

ENGLISH COMPOSITION

A large volume of research has been conducted on the marking of English essays, and one of the methods devised for increasing the reliability of marking has been the introduction of a detailed marking scheme. The system adopted in Fife was based largely on the recommendations of the International Institute Examination Enquiry in 1943 but no special claim is made on its behalf. Indeed, in one experiment where five essays were corrected by two teachers in the same school, the following marks were given for the five essays:

Essay	*Teacher A*	*Teacher B*
1	16	25
2	7	12
3	16	23
4	10	18
5	15	29

Their only point of agreement is in placing No 4 fourth and No 2 fifth. Later developments, however, have shown that where teachers know what they are looking for and mark according to the agreed scheme, the results will vary to a lesser extent.

Another method of reducing the unreliability of marking has been the use of panels of correctors whose reliability of marking has already been proved. There is, however, the practical difficulty of marking 2,655 scripts within two or three weeks.

One of the strongest arguments for including an essay in the promotion scheme, despite the recognised unreliability of marking, is that the teaching of composition in the schools might be neglected in order to train the pupils for the single word answer type of question. This argument, however, suggests a lack of confidence in the teachers: where teachers are truly concerned with the wellbeing of their pupils, they wil not allow a promotion scheme to distort their teaching for the sake of the unwarranted success of some of their pupils.

There is some evidence, also, for the view that a short battery of objective tests, including questions on vocabulary, spelling and English usage, are 'as diagnostic of general English writing ability as a single essay'.*

Because of the unreliability of marking, not a great deal has been done to establish the predictive value of the essay. In one investigation the data of the McClelland inquiry were used to find the effect of including or omitting the composition mark. No significant change in the correlation with success in the secondary school was found.

Two small investigations with the Fife data were carried out—one with senior secondary and one with junior secondary school results. The correlation between the composition marks and success in the Leaving Certificate examinations (LC 5) was calculated for 341 pupils and was found to be 0·205. As composition is part of the English curriculum, the correlation between the composition marks and success in English on the higher grade after six years was calculated for 289 pupils and was found to be 0·176. Neither of these coefficients would justify the inclusion in the test battery of the English composition mark as determined by the Fife scheme.

For the junior secondary school, correlations between the essay marks and general success were available for School P.

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* 'A Further Study of the Reliability of English Essays' Vernon, P E and Millican, G D *British Journal of Statistical Psychology*, vol vii, part ii, November 1954, pp 65-73.

The predictive values of the English measures with and without the essay marks were found for pupils in their first and second years. They were as follows:

	Correlation with Success in	
	First Year	*Second Year*
English measure	·374	·467
English measure+essay	·306	·365

The English measures actually lose in predictive value if the essay is included.

On the evidence available there is little support for the policy of including the essay as part of the battery. Future research might be directed along the lines of constructing English tests to measure a child's capacity for consecutive written work and his ability to organise ideas.

CHAPTER VII

ABLE LEAVERS

THE shortage of trained intelligence in this country has become increasingly evident in recent years. Schools have been unable to recruit a sufficient number of adequately qualified staff; industry is short of trained engineers; and the demand for mathematicians and scientists of university standard is far in excess of the supply. This problem is not peculiar to Britain, as has been shown in America by what has been described as 'the unique concern' with the adequacy of their resources of specialised technical and professional manpower. Automation may diminish the demand for unskilled and semi-skilled workers, but the enlightened forecast is that it will still further increase the demand for skilled personnel. At the present time there appear to be good reasons for doubting whether all the requirements of the professions and industry can be met if the standards of admission continue at their present level and the social services are to expand still further.

The number of young people leaving high schools without completing the courses on which they have embarked is very large, and if even a small proportion of them were capable of qualifying for a Scottish Leaving Certificate and could be persuaded to remain at school to do so, the professional ranks would be considerably reinforced. Data from this inquiry enable further light to be thrown on this important and difficult problem and an estimate to be made of the number of pupils with the necessary ability to succeed in Leaving Certificate courses but who leave school prior to sitting the examination.

In this inquiry the expression 'able leaver' is applied to a pupil who, if he had remained at school for five or six years, would probably have taken a Scottish Leaving Certificate with at least two highers (English being one of them) and three lowers. Pupils were included in this category if they had been admitted to a high school course and their attainments at the stage at which they left school warranted the forecast of their probable success in taking such a certificate. Once pupils had been placed in the category of 'able leaver', their Rectors were asked to give further consideration to each case in order to ensure that pupils had been correctly classified, and at the same time to give any information which might help to explain their reasons for leaving. In addition, the headteachers of the primary schools which the pupils had attended were informed of the pupils' early leaving and asked if they could have foretold that these children would not complete their high school courses and, if so, what factors led them to that opinion. Many of the headteachers interviewed the parents in order to provide as full details as possible on the home background and the cause of leaving school. Almost all the pupils were interviewed by a youth employment officer to ascertain the pupils' employment and reason for leaving school.

THIRD YEAR ABLE LEAVERS

In this category are included the able leavers who left high schools during or at the end of the third year of the course.

The distribution of the third year able leavers according to sex and adjusted average is given in Table XXIV.

TABLE XXIV

ADJUSTED AVERAGES OF THIRD YEAR ABLE LEAVERS

AA	Boys	Girls	Total
95–99	1	2	3
90–94	2	7	9
85–89	7	8	15
80–84	9	21	30
75–79	10	10	20
70–74	3	2	5
Total	32	50	82

From Table XXIV it will be noted that 82 pupils, that is 1·86 per cent of the promotion group, fall into the category of third year able leavers.

One feature of the group is the predominance of girls. This confirms the conclusions of the report of the Central Advisory Council for Education (England) on Early Leaving, in which it is reported 'all the evidence shows that early leaving is commoner among girls than among boys'. There are several reasons for this. For example, there is the attitude common amongst parents that a good education is wasted on a girl because she will probably marry not long after she embarks on a career. Girls also, it is suggested, find the restraints of school more irksome than boys, and the ultimate rewards of continued study appear too remote in comparison with the immediate leisure time enjoyed by companions who have left school. Adverse financial circumstances in the home generally affect girls more than boys, and when there is illness in a family, the burden usually falls upon the girls.

A detailed study of individual cases is revealing, and the three pupils in the class interval 95–99 are worth special attention.

Pupil 1118 (girl—AA 96, S3 40). This pupil, with the highest success mark of the third year able leavers, was the younger of a family of two. Her father was a foundry foreman and was, therefore, well able to keep his daughter at school. She, however, saw no future in staying at school, particularly as most of her friends had enrolled in a B1 course. She left, therefore, at the first opportunity and became a clerkess.

Pupil 854 (boy—AA 96, S3 26). The boy's parents were separated. The children remained with the mother, who worked on constant night shift. This boy, being the eldest, had to look after his younger brother and sister. Despite this handicap, the Rector reports that his work was excellent except in German and Latin. He became a clerk.

Pupil 410 (girl—AA 96, S3 35). This girl was the eldest of four children. Her father was dead and she had to work before leaving school to help to implement the family income. On leaving school she became a junior clerkess, but the wages were too low and she, therefore, left this employment to become a trainee spinner in a textile factory.

In the above cases the school waged an unequal battle against indifference, difficult homes and unfavourable economic circumstances in trying to persuade the pupils to remain at school.

The distribution of the 82 pupils according to their success marks in the third year of their course is set out in Table XXV.

TABLE XXV

SUCCESS MARKS OF THIRD YEAR ABLE LEAVERS

Success Mark	Boys	Girls	Total
40–44	—	1	1
35–39	—	4	4
30–34	7	6	13
25–29	9	13	22
20–24	14	20	34
15–19	2	6	8
Total	32	50	82

From Table XXV it can be seen that many of the pupils in this group were very successful in their high school courses and, if they had continued at school, would, in all probability, have gained a Leaving Certificate.

The type of career entered by the third year able leavers on leaving school is shown in Table XXVI; the classification of employment is that devised by the Registrar General.

Of the eight pupils who continued their studies, two girls enrolled in commercial courses and six boys were enrolled in the pre-apprenticeship engineering course. The boys at least, if they continued their studies at a technical college, could ultimately achieve qualifications equivalent to university graduation.

The four girls in the category 'at home, etc' form part of that small group of young people who are called upon for domestic reasons to forsake a business or professional career.

It will be seen from Table XXVI that the bulk of the pupils went into skilled employment; it might have been anticipated

TABLE XXVI

CLASSIFICATION OF EMPLOYMENT OF THIRD YEAR ABLE LEAVERS

Employment	Boys	Girls	Total
Professional	—	—	—
Intermediate	—	2	2
Skilled	20	42	62
Partly skilled	4	—	4
Unskilled	2	—	2
Further education	6	2	8
At home, etc.	—	4	4
Total	32	50	82

that more, because of their high level of ability, would have followed careers of the intermediate type. The case histories of the two girls in this type of employment are as follows:

Pupil 637 (girl—AA 74, S3 26). Her mother had a nervous breakdown, which upset the family. As a result, the girl became very keen to leave school. Most of her friends in any case were in the B1 group. She became a cashier in a drapery store.

Pupil 1611 (girl—AA 85, S3 22). Parents and pupil made it clear that the girl never intended to stay beyond the third year; she became a book-keeper.

The homes of these two pupils were such that neither of them would have continued at school and entered upon a professional career.

The two boys in unskilled employment are also worthy of attention.

Pupil 7 (boy—AA 94, S3 24). This boy suffered from mental blackouts and was unfit for prolonged study. He became a grocer's message boy, but intended to enter Royal Navy Boys' Service as soon as he became of age. With his disability, it is doubtful whether he would ever achieve his ambition.

Pupil 729 (boy—AA 86, S3 29). This boy was a strong personality and objected to 'being ordered about' by teachers. His friends were in the B1 group. He took employment as a labourer with furniture manufacturers.

Physical defects and character weaknesses will undoubtedly prevent a number of young people from developing their talents to the full.

Many able pupils embark on a high school course but, even though they fulfil the promise forecast by their primary school teachers, they have little or no hope of continuing their studies beyond the statutory school leaving age, because their parents have no intention of keeping them at school beyond the period prescribed by law. For the boys, this may not be the end of the educational road because the technical colleges can offer them an opportunity of taking academic qualifications while they are in employment. For most of the girls, it is a farewell to study. In no fewer than 51 cases, i.e. 62 per cent of the group, parents had indicated to the primary school head-teachers that their children would remain at school for three years only.

The following case histories tell their own somewhat sad tale:

Pupil 892 (girl—AA 83, S3 33). Her parents' choice was B1 because they did not wish the girl to go to high school. They were prepared to make no sacrifice on her behalf; she was the youngest of five. She had no friends among those staying on at school and left school to become a junior clerkess.

Pupil 260 (girl—A 83, S3 22). She was an only child whose father was a fisherman. He was determined that the girl would leave at 15. Her mother was prepared to go out to work to help keep the girl at school, but the father would not agree. She became a grocer's assistant.

Pupil 1463 (girl—AA 81, S3 26). Her father was not in good health and the girl had to leave school to help to supplement the family income. The parents' wish was originally for a B1 course. On leaving school she became a shorthand typist.

Of the third year able leavers, six had been enrolled in high school courses only after the Promotion Board had made a special appeal to the parents to alter their original choice of a B1 course and allow their children to follow an 'A' course. The wisdom or otherwise of such persuasion is, as has already been stated, a matter for individual judgment.

FOURTH YEAR ABLE LEAVERS

In this category are included the able leavers who left high schools during or at the end of the fourth year of their course.

The estimation of probable success of such pupils in Leaving Certificate examinations was difficult because some had entered on specialised courses. For example, fourth year intensive commercial courses were organised for pupils who had successfully completed three years in a high school and who did not intend to continue to the Leaving Certificate stage but who wished to complete a fourth year. There were in all 62 fourth year able leavers—28 who did not intend to remain at school after attaining the statutory leaving age, which they reached during the first term of the fourth year, 18 who entered intensive commercial or technical courses, and 16 who had started on courses leading to the Scottish Leaving Certificate.

The distribution of the fourth year able leavers according to sex and adjusted averages is given in Table XXVII.

TABLE XXVII

ADJUSTED AVERAGES OF FOURTH YEAR ABLE LEAVERS

AA	Boys	Girls	Total
95–99	1	—	1
90–94	4	6	10
85–89	5	14	19
80–84	2	16	18
75–79	3	8	11
70–74	—	3	3
Total	15	47	62

The 62 fourth year able leavers constituted 1·4 per cent of the total promotion group. It will be seen also that, as in the third year group, there were more girls than boys of high ability who left school during the fourth year of the course.

It would appear that the fourth year able leavers are, on the whole, of higher ability than those who left during the third year. The mean adjusted average of the fourth year group is 84·11 (σ=5·31) compared with the mean of the third year group of 82·7 (σ=5·79). The factors which induce young people of ability to leave school during the third year of a Leaving Certificate course are also at work with the fourth year group. There are those whose character qualities will prevent them from successfully undertaking the course which their elders feel they ought to follow. For example:

Pupil 398 (boy—AA 95, S4 27). His Rector thought him capable of passing Higher English, Higher Geography, Lower History, Lower Science and Lower French. His father was an electric wireman who was keen on educating his children. An older daughter was at Training College and was doing well. The boy was headstrong and was determined to join the R.A.F. He refused to take advice on later entry.

This case may be compared with Pupil 729, page 117.

It might have been possible at the primary school level to have forecast that those who were borderline cases for admission to high school courses would not have completed the course. The following cases illustrate the point:

Pupil 656 (girl—AA 74). This girl left immediately after her fifteeneth birthday. Her father was a colliery tradesman and her stepmother was also in employment at times. There were two younger stepsisters. The girl could see no reason for staying at school and, as the parents were indifferent, she left school and became a junior clerkess.

Pupil 2452 (girl—AA 74). This girl had completed fourth year intensive commercial course before reaching leaving date following her fifteenth birthday. Her work in primary school was never good but she appeared to improve at secondary school. She became a junior typist.

A study of many of the case histories makes it clear that offices can still recruit able girls, even when there is a scarcity of talent, from among those who leave school early because of adverse home backgrounds.

The type of employment of the fourth year able leavers is given in Table XXVIII.

The two boys who entered full-time further education enrolled in pre-apprenticeship engineering courses, and thus could be

TABLE XXVIII

CLASSIFICATION OF EMPLOYMENT OF FOURTH YEAR ABLE LEAVERS

Employment	Boys	Girls	Total
Professional	1	—	1
Intermediate	1	3	4
Skilled	9	42	51
Partly skilled	1	2	3
Unskilled	—	—	—
Further education	2	—	2
Services	1	—	1
Total	15	47	62

said to have still an opportunity of attaining professional qualifications.

The following case history of one of the three pupils who entered partly skilled employment tells what should be by now a familiar story:

Pupil 414 (girl—AA 80). This girl's mother was unmarried. They lived with the grandmother in a Council house with a high rent and the girl felt that she should leave school and help to augment the family income. This she did and became an overlooker in a hosiery factory.

Interviews with the parents revealed that 38 of them had no intention of keeping their children at school for more than three or four years. In all, only 19 girls and 10 boys, i.e. 47 per cent of the group, left school immediately they reached the statutory leaving age. In some instances pupils remained at school in order to complete their commercial course, and in others the Rectors tried hard to retain the pupils, although ultimately they had to admit defeat because of the home influence. The following cases illustrate the difficulties against which teachers are struggling to increase the number of pupils taking the Leaving Certificate:

Pupil 1241 (boy—AA 89). The father of this pupil was an electrician who had five children. The boy, fourth in the family, wanted to enrol in a B1 course because older members of the family were in B1 courses. Pressure by the primary headteacher persuaded the boy to go to high school, but as he had little drive or ambition, he left immediately he became 15 and became an apprentice painter.

Pupil 1146 (girl—AA 77, S4 33). The Rector estimated that this girl could have gained a Leaving Certificate with Higher English, Higher Mathematics, Higher Science, Higher Dynamics, Lower History and Lower French. The father, a tractor driver, did not consider it worth while to keep the girl at school. An elder sister worked on the farm and a younger brother of 'A' calibre was in a 'B' course despite pressure from the headteacher. The girl became a laboratory assistant.

The group of 16 pupils who entered upon a Leaving Certificate course but left by the end of the session is worthy of closer study. The distribution of their success marks is given in Table XXIX.

TABLE XXIX

SUCCESS MARKS OF FOURTH YEAR ABLE LEAVERS IN SCOTTISH LEAVING CERTIFICATE COURSES

Success Mark	Boys	Girls	Total
40–44	—	1	1
35–39	1	2	3
30–34	1	4	5
25–29	3	3	6
20–24	—	1	1
Total	5	11	16

The case of the pupil in this group who had the highest success mark is perhaps characteristic:

Pupil 1177 (girl—AA 90, S4 43). The Rector estimated her as being capable of gaining a Leaving Certificate with Higher English, Higher Geography, Higher French, Higher Commercial and Lower History, and in his opinion she was a first class girl. She was the elder of two children. Her father was a miner, and it definitely was not the girl's fault that she left school. She became a bank clerkess.

It is of interest, also, to study the success marks of the fourth year able leavers at the end of the third year.

TABLE XXX

SUCCESS MARKS OF FOURTH YEAR ABLE LEAVERS AT THE THIRD YEAR STAGE

Success Mark	Boys	Girls	Total
40–44	—	1	1
35–39	3	5	8
30–34	4	11	15
25–29	4	14	18
20–24	3	11	14
15–19	1	4	5
10–14	—	—	—
5–9	—	1	1
Total	15	47	62

The mean success mark was 27·24 ($\sigma=6{\cdot}41$) compared with 25·4 ($\sigma=5{\cdot}04$) of the third year able leavers, which indicates that those who remained at school for a longer period were more talented than those who left at the end of the third year.

FIFTH YEAR ABLE LEAVERS

There was one child who left school during the fifth year of her course and who, in the opinion of the Rector, was capable of gaining a Leaving Certificate. It appears, therefore, that those who survive until the fifth year of the course generally sit the Leaving Certificate examinations. The case history of the fifth year able leaver was as follows:

Pupil 261 (girl—AA 87, S4 21). Had she taken the Leaving Certificate examination, she would probably have taken two highers, one of which was English, and three lowers. Her father died and the mother re-married. The new home was a good one, the stepfather being a wireless operator. The girl left because she was offered a post as a telephone operator in the G.P.O.

SUMMARY AND CONCLUSIONS

Perhaps the most important conclusion to be drawn from the study of the able leavers is that they did not constitute a very large proportion of those who embarked on high school courses: their total number was 145, which represents approximately 3·3 per cent of the total promotion group. Consideration of individual case histories, also, makes it clear that many of them embarked on high school courses with every intention of leaving school as soon as they reached the statutory school leaving age. The number of able pupils leaving school early who could be persuaded to remain at school to take the Leaving Certificate appears to be, therefore, relatively small.

There were about twice as many girls as boys amongst the able leavers, which confirms the results of other investigations which have been made on this problem. There appears to be still an attitude amongst parents that higher education is wasted on girls. Whenever the burden of illness or adverse economic circumstances falls upon a family, it is the girl's education which is generally sacrificed. From the case histories, also, it can be deduced that irritation with school discipline and the attractions of leisure-time activities enjoyed by friends who have left school have a greater disturbing influence on the girls than on the boys.

Of the major factors which influence able pupils to leave school early, the most important is the home of the pupil; success in high school courses depends, to a very large extent, on the interest which the parents show in a child's educational career. Illness in the home, adverse economic circumstances and indifference to the advantages of higher education affect a child's attitude to and the time he may spend on his studies. Without a sympathetic and encouraging home, a pupil has little chance of winning through to the Leaving Certificate examination.

A pupil may have a high innate ability but lack the character qualities which are essential for academic success. Boys, in particular, sometimes find the attraction of a career too strong to resist and, despite headteachers' advice and parents' pleading, leave school. In one or two cases, also, physical defects prevented a young person from continuing to the end of a high school course.

The above factors all assist in lessening the predictive value of a promotion battery. An able child who has made good in the primary school sometimes has a home which is so antipathetic that he is given little or no opportunity of developing his talents to the full, whereas a less able child from a sympathetic home sometimes achieves in the high school an attainment beyond the expectations of his primary school teachers.

Not all able leavers can be classified as wastage. Many of the boys who leave school early are employed in industry, and by attendance at local technical colleges and Central Institutions can eventually attain professional status. The girls, on the other hand, normally enter clerical employment and are lost to the professions.

The success or failure of a pupil had been judged in this inquiry by his performance in the class examinations in the subjects of the course which he has followed. It is possible, however, that the choice of course in every case has not been satisfactory, and if some of the pupils had been allocated to different courses, they would have achieved a success rather than a failure rating. Indeed, it might well be that the schools are not providing the courses from which all able pupils can profit. The number of pupils judged capable of gaining a Leaving Certificate could be much greater than has been estimated because the courses and methods of instruction at present in the high schools may not adequately meet the needs of all able pupils.

CHAPTER VIII

LEAVING CERTIFICATE ATTAINMENT

Two data must be known before consideration can be given to the 'pass mark' for admission to high school courses: first, the correlation between the promotion battery and the Leaving Certificate results; secondly, the Leaving Certificate attainments of the pupils at different ability levels. The correlation has been established; and this chapter deals with the results of the Leaving Certificate examinations.

The success of each pupil in the Leaving Certificate examinations can be measured by awarding 2 points for a pass in a subject on the higher grade and 1 point for a pass in a subject on the lower grade. Thus, a pupil with four higher and two lower passes would be awarded 10 points. No account is taken of the number of attempts to obtain the certificate, nor are points given for arithmetic, analysis and additional geometry; a higher pass cancels a lower in the same subject.

Among the pupils sitting the Leaving Certificate examinations were several who were not included in the promotion group; these, because of change of residence, had been enrolled in the high schools from schools outwith Fife. In a like manner, there was a number of pupils in the promotion group who left Fife schools. In dealing with the results of the Leaving Certificate examinations, it is assumed that the incoming pupils replace those leaving the promotion group. While comparisons between the promotion battery and Leaving Certificate results cannot take incoming pupils into account because there are no test results which can be assigned to them, any discussion of the Leaving Certificate results as a whole must include their attainments.

McClelland's criterion of success was the group certificate which was awarded to pupils with a minimum of two passes on the higher standard, one of which had to be English, and three passes on the lower standard. In terms of pointage, this minimum certificate carries a value of 7. At the time of the Dundee inquiry, the certificate, to be referred to in this report as the 'group certificate' or SLC, had to be gained at one sitting, whereas under the regulations in force at the time of the enquiry pupils were given two opportunities of achieving the passes to gain such a certificate.

ATTAINMENT AFTER SIX YEARS

Table XXXI gives the Leaving Certificate attainments of the promotion group at the various levels of AA after six years; each small figure in the body of the table indicates the number of pupils who gained 7 points or more but who failed to pass in English on the higher standard.

Table XXXI shows that 444 pupils or 10·1 per cent of the promotion group sat the Leaving Certificate examinations, and that of these 276 or 6·27 per cent of the total promotion group gained the SLC. After six years approximately 62 per cent of those who sit the Leaving Certificate examinations gain a SLC.

In order to qualify for admission to a Scottish university, a pupil must possess a certificate with three passes on the higher standard and two on the lower standard, provided the higher passes include English and another language or mathematics, and the certificate includes among its five subjects a pass in mathematics or science: such a certificate is referred to in this report as UEG. In Table XXXI it is shown that 173 pupils or 3·92 per cent of the total promotion group qualified for admission to a university after six years. Thirty-nine per cent of those who reach the examination stage gain a UEG.

McClelland pointed out that there are no scientific means of deciding whether the error in admitting to a high school course a pupil who fails is greater or less than the error of excluding a pupil who would have succeeded. He assumed that each error, described as a 'misfit', is equally harmful, and thus the pass mark should be fixed at the point at which the number of misfits is at a minimum. At this point a pupil has a fifty-fifty chance

TABLE XXXI

LEAVING CERTIFICATE ATTAINMENT OF PROMOTION GROUP AFTER SIX YEARS

AA	*No. of Pupils attaining SLC pointage*															Total
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
105+												2				2
100–104										1	4	2	2	2		11
95–99						1		3	3	5	5	6	3	4	1	31
90–94			1	1	1	2	4	5	14	9	15	6	2	3		63
85–89		2	2	4	8	10	15	16_1	20_1	11_1	14	8	4	1		115
80–84	2	1	4	7	12	13	9	12	15_1	11	7	1	3			97
75–79		2	3	4	6	7	8	14_1	6	3	2_1	2				57
70–74		2	1	2	3	1	3	3_1	3							18
65–69				1	2		1		1							5
60–64		1		1												2
Promotion	2	8	11	20	32	34	40	53_3	62_2	40_1	47_1	27	14	10	1	401
Incoming		1	1	2	1	2	6	8_1	5	5	5	4	1	2		43
Total	2	9	12	22	33	36	46	61_4	67_2	45_1	52_1	31	15	12	1	444
SLC								57	65	44	51	31	15	12	1	276
UEG									32	32	50	31	15	12	1	173

of success. In other words, if 100 pupils score this mark and are admitted to high school courses, 50 of them will probably succeed and 50 will probably fail. Unfortunately, there is no means of knowing which individuals will succeed and which fail. It is necessary, therefore, to find the AA at which a pupil will have a fifty-fifty chance of gaining a group Leaving Certificate in order to determine whether the pass mark derived from the Fife data is comparable with that established by McClelland. Table XXXI provides the information from which this AA can be calculated, and the success ratios at different ability levels are given in Table XXXII.

From Table XXXII it will be seen that the AA at which a pupil has a fifty-fifty chance of gaining the group Leaving Certificate is 82 or 1·13 sigma above the mean. According to the McClelland figures, a pupil with an IQ of 110 had an even chance of success, whereas the Fife data suggest that the required level is IQ 117.

Several reasons can be adduced to explain the difference between the two figures. For example, McClelland was able to follow the pupils only to the end of their third year and, for his measure of success, had to rely on headteachers' estimates, which he himself admitted were generally on the generous side. Again, there are those who will hold that the difference is due to the increased difficulty of the Leaving Certificate examinations, although there are others who counter this argument by declaring that a pupil has now two opportunities of gaining the passes to make up his certificate whereas previously he had to gain the certificate at one sitting.

The difference in the circumstances of the groups under consideration can make considerable difference in the ability level for the fifty-fifty chance of success. For instance, in the McClelland investigation only 44 per cent of the pupils above the pass mark entered Leaving Certificate courses, whereas in Fife of those who reached the pass mark 91 per cent enrolled in such courses. It has already been pointed out that there are other fundamental differences in the circumstances of the groups, such as the raising of the statutory school leaving age, the provision of free secondary education, the difference in the nature of the education areas in which the two inquiries were made, and the very great economic changes which have taken place since 1936.

TABLE XXXII

Success Ratios for SLC

AA	No. of Pupils Fail	 Success	Total	Success Ratio as Percentage
105	—	2	2	100
100–104	—	11	11	100
95–99	1	30	31	97
90–94	9	54	63	86
85–89	44	71	115	62
80–84	49	48	97	50
75–79	32	25	57	44
70–74	13	5	18	28
65–69	4	1	5	20
60–64	2	0	2	0

From Table XXXI it is also possible to calculate the AAs at which a pupil has a fifty-fifty chance of gaining a certificate with the various pointage values. The calculations for the values 5 points and under and 10 points and over have little reliability because of the small numbers involved. Table XXXIII gives the success ratios for certificates valued from 6 to 9 points, and also those for the UEG.

It will be seen from Table XXXIII that there is no difference between the even chance of success for SLC and a 7 points certificate. The difference, however, between 7 points and 6 points is considerable, and it would seem to indicate that if the SLC were to be 'devalued' by 1 point only, many more pupils would gain this certificate.

In order to have an even chance of success for a UEG the pupils must have an AA of 90 which is roughly equivalent to an IQ of 125. This ability level is reached theoretically only by some 4·7 per cent of a total age group.

TABLE XXXIII

Success Ratios for Certificates valued 6 to 9 Points and for UEG

AA	N	SLC Pointage								UEG	
		6		7		8		9			
		S	%	S	%	S	%	S	%	S	%
105+	2	2	100	2	100	2	100	2	100	2	100
100–104	11	11	100	11	100	11	100	11	100	11	100
95–99	31	30	97	30	97	27	87	24	77	25	81
90–94	63	58	92	54	86	49	78	35	55	45	71
85–89	115	89	77	74	64	58	50	38	33	43	37
80–84	97	58	60	49	50	37	38	22	23	22	23
75–79	57	35	61	27	47	13	23	7	12	8	14
70–74	18	9	50	6	33	3	17	0	0	1	6
65–69	5	2	40	1	20	1	20	0	0	0	0
60–64	2	0	0	0	0	0	0	0	0	0	0
AA for 50/50 chance of success		72		82		87		90		90	
IQ equivalent		107		117		122		125		125	

Attainment after Five Years

The 444 pupils whose attainments after six years are shown in Table XXXI might be classified after five years into three groups:

(*a*) pupils who sat the examinations in their fifth year and left school;

(*b*) pupils who sat the examinations in their fifth year and continued at school for a sixth year;

(*c*) pupils who had repeated a year of the course amd sat the Leaving Certificate examinations for the first time in their sixth year.

The number in each group and their attainment in SLC and UEG after five years are as follows:

	Number of Pupils		
Category	*in Group*	*SLC*	*UEG*
(*a*)	145	47	21
(*b*)	255	113	79
(*c*)	44	—	—
Total	444	160	100

The increase in the number of SLCs gained by the promotion group from the fifth to the sixth year is from 160 to 276, and in UEGs from 100 to 173.

The attainment of the total promotion group after five years in terms of points is given in Table XXXIV.

From this data the even chance of success for the different levels of Leaving Certificate attainment was calculated, and comparative figures with sixth year attainment are as follows:

AA for even chance of success in the Leaving Certificate

	after 5 *years*	*after* 6 *years*
UEG	93	90
SLC	90	82
8 points	91	87
7 points	90	82
6 points	82	72

The AA for a fifty-fifty chance of gaining a SLC has risen to the high figure of 90 and this objective was gained by only 3·6 per cent of the promotion group.

It would be difficult to establish whether the standard of the Leaving Certificate has altered since the time of the McClelland inquiry, but it is evident that the certificate is generally regarded by many pupils and teachers as a two-year certificate rather than one which is taken at the first attempt. Rectors agreed that even some able pupils tend to take " two bites at the cherry ", whereas under the previous regulations they would have taken only one. It was also agreed that not a few less able pupils, who formerly would have been unable to gain a SLC could now do so by having two occasions on which to gain passes in the subjects of their course.

TABLE XXXIV

Leaving Certificate Attainment of Promotion Group after Five Years

AA	*Number of Pupils attaining SLC pointage*															Total
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
105+												2				2
100–104										3	4	4				11
95–99				1		1	2	2	5	7	6	7				31
90–94			2	3	3	6	6	8_1	9	6	11	5				59
85–89	1	2	5	8	18	18	16	9_2	18_2	9_1	5	3				112
80–84	1	1	7	8	17	14	20	6	5	3	4					86
75–79		2	4	3	8	7	6	5_2	1	2						38
70–74		4		4	3	1	2									14
65–69					2											2
60–64		1		1												2
Promotion	2	10	18	28	51	47	52	30_5	38_2	30_1	30	21				357
Incoming		1	2	4	3	4	8	9_1	4	4_1	1	3				43
Total	2	11	20	32	54	51	60	39_6	42_2	34_2	31	24				400
SLC								33	40	32	31	24				160
UEG									20	26	31	23				100

In this connection the increased attainment of the 255 pupils who remained at school for a sixth year is of special interest. The results are given in Table XXXV.

The attainments of the group who had two opportunities of sitting the Leaving Certificate examinations increased by almost 100 per cent; SLCs increased from 113 to 214 and UEGs from 79 to 142. It is worth noting that after the second diet of examinations only 41 of the 255 pupils had not gained a SLC and of these, 20 were only 1 point short of the certificate value of 7 points. The average pointage per pupil after five years was 6·6 and after six years 8·9, an increase of 2·3 points.

REASONS FOR FAILURE AND SUCCESS

Table XXXI is a fascinating one for educationists who are more interested in persons than in statistics. If answers could be found to some of the questions which automatically arise from a scrutiny of the table, the efficiency of selection would be increased and perhaps, what is more important, the provision of secondary education could be more soundly based. It is not possible in a report of this nature to follow all the educational trails, but three of the more obvious have been explored.

(1) *Pupils whose AA was below the Pass Mark, but who gained a SLC*

There were six pupils in this category, five boys and one girl, and in no case was there a forecast by both Board and headteacher that the pupil would be successful in an 'A' course. The following three cases are typical:

Pupil 2152 (boy—AA 73). This pupil was transferred to an 'A' course after a year in a B1 course and sat the Leaving Certificate examinations for the first time, therefore, after six years in a secondary course, gaining 7 points. The headteacher reported 'An excellent boy who is a hard worker for the school and himself, was appointed deputy head boy and is continuing at school for a seventh year.' Of the six pupils in this category he was the only one who did not require two attempts to pass English on the higher standard.

Pupil 218 (boy—AA 65). Few would have predicted that this pupil would gain a Leaving Certificate of 8 points. His high school Rector reported, 'A dreary looking boy, no good at games, a fine

TABLE XXXV

Attainment of Pupils who Sat the Examinations in Fifth and Sixth Years

Group	*Number of Pupils attaining SLC pointage*															Total
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
	After Five Years															
Total Promotion	1	4	11	14	35	29	40	21_4	24_2	28_2	26	22				255
SLG								17	22	26	26	22				113
UEG									11	21	26	21				79
	After Six Years															
Total Promotion	0	1	1	0	6	7	20	30_2	48_2	38_1	47_1	29	15	12	1	255
SLC								28	46	37	46	29	15	12	1	214
UEG									22	21	42	29	15	12	1	142

comic actor, who writes English very well and has a lively imagination and a fund of general knowledge.' His future career was to be journalism.

Pupil 421 (girl—AA 73). This girl, who had a cleft palate, was hindered at school by frequent absences through illness. Her school report indicated that she was earnest, a hard worker, and was encouraged by a good home background. She entered on a three years commercial course and transferred to a Leaving Certificate course in which she gained a SLC with 8 points after six years having a record of no failures in any Leaving Certificate examination for which she was presented.

Although it would be unwise to base any principles on these cases, it is clear that exceptional qualities of character and the encouragement from a good home background do help pupils to achieve attainments which other more able pupils do not achieve. A pass in English on the higher standard, however, presents a hurdle which such pupils can clear only with difficulty.

There is the reverse side of the coin, namely, those pupils about whom there appeared to be little doubt of ultimate success but who did not gain a SLC.

(2) *Pupils with AA* 90+ *but who failed to gain a SLC*

There were 10 such pupils, 6 boys and 4 girls. The following case histories are illustrative:

Pupil 2008 (girl—AA 90) LC 6 points. This girl, described as having good taste, came from a good home background. Although the parents themselves were not from the professions, many of their relatives were. Aware of the necessary qualifications for admission to a domestic science college, this pupil did not work tremendously hard but just sufficient to attain the goal at which she was aiming. With application she could have easily gained a SLC.

Pupil 996 (boy—AA 92) LC 6 points. The home background of this pupil was definitely non-bookish although the parents were anxious that the boy should go to the university. By the time the pupil reached the fourth year of the course, he was finding the work difficult and had to repeat this year of the course. The Rector reported that the boy was lazy and peculiar, but he was returning to school for a seventh year, having gained English (H), history (H), geography (L), French (L) and arithmetic.

Pupil 719 (girl—AA 94) LC 5 points. This pupil repeated the fourth year of the course. The Rector's report was 'Has first-rate ability and is outstanding at figures—but applies it only when interested, for example, she was dux in commercial subjects. Has a decided will of her own. Should do very well if she finds her niche.' On leaving school she became a clerkess.

From a study of the cases in this category it is evident that the factors of home and character which may bring success can, when unfavourable, cause failure.

(3) *Pupils who Attained 7 Points or more but failed in English on the Higher Standard*

There were 8 such cases, 7 boys and 1 girl.

One common feature of the profiles of these pupils was immediately noticeable: each pupil had a relatively low score in the English objective test. The mean Qe for the 8 pupils was 75·5. The following case history is illustrative:

Pupil 641 (boy—AA 77) Qe 68, Qa 82. This boy gained 7 points in his fifth year with a certificate which included Mathematics (H) and Science (H): he left school to become a laboratory assistant with the National Coal Board.

It would appear that some pupils are strong on the mathematics/science side and find English and linguistic subjects difficult to master. For example:

Pupil 54 (boy—AA 75) Qe 78, Qa 82, LC 10 points. A leaving certificate with 10 points is no mean achievement, particularly when it includes passes on the higher standard in mathematics, science, engineering and technical subjects. English was beyond his capacity and he could pass English on the lower standard only at the second attempt.

Another pupil gained a certificate with mathematics (H), science (H) and passes in the three advanced mathematics papers of dynamics, analysis and geometry, but could gain his university entrance qualification only by sitting the University Preliminary examinations.

Some pupils find the paper on English literature of particular difficulty. For example:

Pupil 1006 (girl—AA 82) Qe 79, LC 8 points. This girl gained a pass in English on the lower standard but, according to the Rector's report, failed unexpectedly on the higher standard in her sixth year, largely due to a low mark in the literature paper. It is her ambition to be a teacher of infants and is undertaking temporary work for a year while she is studying for the University Preliminary examinations.

A low mark in the English objective test seems to denote the possibility of failure in English at the Leaving Certificate stage. Pupils who are good at mathematics and science may find difficulty with the English Leaving Certificate examinations, and it has been suggested that the nature of these examinations lies at the root of the trouble. Pupils from homes where there is little in the way of general reading tend to read little and find themselves at a disadvantage at examination time.

Conclusions

Perhaps the factor which accounts for success or failure in a high school to a greater extent than any other is the character of the pupil. The pupil with high intelligence but lacking the will to work is unlikely to succeed; the pupil of low intellectual ability cannot succeed no matter how hard he tries but the borderline pupil who is diligent and determined may attain success beyond expectation. The distractions of the present day make it difficult for many children to settle down to the hard work which is necessary to achieve academic success in the high school, and not a few of them fall by the wayside because they lack the will to work: outside the school there is little realisation of the sacrifice which these young people have to make in order to achieve success. The spur of incentive, also, can bring about surprising results; several pupils who had been promoted from B1 to 'A' courses worked extremely hard and attained standards which appeared to be well beyond those normally achieved by pupils of such ability.

A second factor which determines success or failure is the home of the pupil. If the pupil comes from a home in which he receives encouragement, he will be much more likely to succeed than his classmate of equal ability whose parents are indifferent to academic achievement. It must be remembered, also, that high school courses are still largely book-based; pupils from a non-literary background embark on the course at a big disadvantage compared with those of equal ability from homes where books are in common use.

Character qualities and home background may be the determining factors of a pupil's ultimate success or failure in a high school. The scientist, however, cannot measure these by any satisfactory yard-stick. Not only so, it would be socially unjust to make any attempt to take into account a pupil's home conditions in allocating him to an appropriate secondary course of instruction.

The nature of the Scottish Leaving Certificate, also, may account for the lack of success of some pupils: it still has a predominantly literary quality. It is perhaps because of this that the English objective test has proved to be one of the best predictors of success. The fact that several able pupils can pass the examinations in mathematics and science with little difficulty yet have a hard struggle to gain a pass in English calls for further enquiry into the nature of the education and of the examinations in our high schools.

One of the reasons for the introduction of the system of giving a pupil two attempts to achieve the certificate was to encourage the less able pupil. In this it has undoubtedly been successful. On the other hand, it has created a situation which was never contemplated. Some able pupils are not prepared to make the effort which is necessary to achieve the certificate at one attempt, and accordingly tend to slacken their efforts and take the certificate over two years. This in turn may have a serious effect on the standard of work which is being done in the sixth year of some of the smaller schools.

A study of individual cases, also, reveals what is well known to research workers, namely, that human beings defy exact measurement. It is held by some that schemes of selection have reached the limits of their efficiency and any further improvements which can be made are of a minor nature. This may be the case, but it must also be remembered that the predictive value of any measurement depends upon the reliability of the measurement of success. Pupils may be classified as failures, not because of their lack of ability nor because of their lack of attainment throughout the course, but because of fundamental weaknesses in the examination system. Take, for example, the following case:

Pupil 1117 (girl—AA 98). This pupil, whose IQ was 135, followed a two-language course and was placed 15th in a class of the 36 most able girls in the school. Her work in the school examinations showed that her attainments were in keeping with her innate ability and after five years she was presented for the maximum number of subjects for the course, four subjects on the higher grade and one on the lower. In the Leaving Certificate examinations she failed unexpectedly in mathematics and French. Her home background was favourable, there were no defects in character, and she was taught by the best teachers in the respective departments. She easily gained the passes in the University Preliminary examinations, which gave her the qualifications for admission to a Training College.

The Rector, when asked to report on this case, wrote: 'There is no obvious reason for her comparative lack of success.' There is one 'obvious reason' and that is the unreliability of written examinations, which has been revealed over and over again by research workers: not only are the examinations unreliable but also the pupils, particularly adolescent girls, cannot be relied upon to give a similar account of themselves on different occasions. The above case demonstrates the folly of a system which determines a child's success or failure on the result of one examination set on a particular day, and an apparent refusal to take into account the school record over five years.

CHAPTER IX

REALLOCATION

SUFFICIENT evidence has been given to establish the conclusion that the allocation of a pupil to a secondary course of instruction at the age of twelve years must not be irrevocable. Throughout his secondary career a pupil should be given every opportunity to transfer from the course to which he had been originally allocated to one which better meets the educational needs of his age, ability and aptitude. Reallocation should be made both of the pupil who finds his original course too difficult and of the one who is in a course which is not developing to the full his potential ability.

REALLOCATION TO 'A' COURSES

There are three views regarding the course to which a pupil should be allocated—the wish of the parents, the headteacher's recommendation, and the decision of the Board. For easy reference three capital letters in succession are used to denote the respective recommendations for each child and will be described as the PHB recommendation; the PHB recommendation ABB denotes that the parents wished an 'A' course, but both headteacher and Board were in agreement that the pupil was best fitted for a 'B' course.

Fifty-three pupils were transferred from 'B' to 'A' courses at various stages in their secondary school careers, and they can be classified according to their PHB recommendations as follows:

AAB—19
ABB—16
BBB—18

1. *AAB*

Reference has already been made to these 19 pupils in Chapter V in the section entitled 'Allocation to 'B' courses against the headteacher's recommendation'. The distribution of the AAs of these pupils is:

AA	*Number of Pupils*
73	1
72	7
71	3
70	4
Below 70	4

Three of the 19 pupils reached the Leaving Certificate stage and their case histories are as follows:

Pupil 2337 (boy—AA 70). This boy did very well in his 'B' course and transferred to an 'A' course at the end of the third year. In the fifth year of high school he gained mathematics (L), science (L), and technical subjects (H), and in the sixth year English (L), mathematics (H) and science (H), leaving school to enrol in an engineering course in a Central Institution. The Rector described him as 'a pupil of limited ability who has worked hard.'

Pupil 2357 (boy—AA 72). This pupil transferred to an 'A' course at the end of the first year. After six years in the high school, he left to become an analytical chemist, having gained a certificate with English (L), history (L), geography (L), mathematics (L) and science (H). His Rector reported 'He has worked to capacity.'

Pupil 306 (boy—AA 71). After six months in a 'B' course, this boy was transferred to an 'A' course. In the fifth year he passed in English (L), failing in history, geography and French. In his sixth year he passed in English (H), geography (H), French (L) and mathematics (L), failing in science. He sat the University Preliminary examination in science and passed on the lower standard, taking up employment in a laboratory of an industrial firm. His Rector reported that he was a rather colourless boy who seemed to find the work rather too much for him.

Of the other 16 pupils in this category, all left at the end or before the end of the third year of the course, except one who continued until the fourth year.

Pupil 1752 (girl—AA 72). This girl transferred to an 'A' course after six months in the 'B' course to which she had been allocated. At the end of the third year, she had a success mark of 16 but found difficulty with mathematics and science, having a mark of E for each of these subjects. She took a fourth year intensive commercial course and left for employment as a clerkess.

Most of the pupils in the category AAB who were reallocated to 'A' courses transferred at the end of the first year of their secondary school careers. All except 4 left school not long after reaching the statutory school leaving age, having found the high school course difficult and beyond their intellectual capacity. Although none of the 4 gained a group SLC, it may be fairly concluded that they had derived some benefit from the reallocation. The Board's recommendations were therefore sound in at least 15 of the 19 cases, but 15 parents had the satisfaction of knowing that their children had been given an opportunity of undertaking the course of their choice, even though they had not made a success of it. It is left to the reader to assess whether there is a credit or debit in the educational balance sheet.

2. *ABB*

There were 16 pupils who were transferred from a 'B' to an 'A' course and about whom Board and headteacher were in agreement that the parents' wish for an 'A' course should not be granted. The distribution of their AAs was as follows:

AA	*Number of Pupils*
73	2
72	0
71	4
70	3
Below 70	7

Six of the 16 reached the Leaving Certificate stage. Of these, 3 were transferred at the end of the first year, 1 at the end of the second year, and 2 at the end of the third year of their secondary course. All of them had an AA of 70 or below. One of them, with an AA of 65, gained a group SLC, and this case

(Pupil 218) has already been described in Chapter VIII. Of the others, the following are typical:

Pupil 2341 (girl—AA 70). This pupil was transferred to an 'A' course at the end of the second year and given a modified curriculum. At the end of the fifth year of the course, she had gained homecraft (L), failing in English, history and geography on the lower standard. In the sixth year she failed again in English, history and geography. The Rector reported that she was earnest and conscientious but only of moderate ability. She received an appointment in the Civil Service.

Pupil 2366 (boy—AA 70). This boy was transferred to an 'A' course at the end of the first year, having been reported on as being able and conscientious. After six years at school, he had gained passes in mathematics (L) and science (L), leaving school to become a mining surveyor. The Rector reported that he had no great ability and had probably done his best.

Of the 6 who reached the Leaving Certificate stage, only 1, an exceptional pupil, gained a group SLC. The others struggled with what appear to have been courses which were too difficult for them. All of them are described as being conscientious but with no great intellectual ability for an academic course. Clearly, pupils, even when supported by good character and encouragement from home, cannot overcome the handicap of lack of intellectual ability.

The other 10 in this category struggled without much success until they reached the third year. It is difficult to decide whether their transfer had been educationally worth while, but again the parents were satisfied that their children had not been denied the opportunity of attempting an academic course.

When Board and headteacher are in agreement, their prediction is accurate if examination results are the criterion of success.

3. *BBB*

This category consists of pupils who were originally allocated to a 'B' course in accordance with the wishes of the parents but who, because of high attainment, were persuaded to transfer to an 'A' course.

The distribution of their AAs was as follows:

AA	*Number of Pupils*
83	1
79	1
75	4
74	1
73	3
72	1
71	0
70	2
Below 70	5

There were 18 pupils, of whom 13 reached the Leaving Certificate stage. Nine of the 18 pupils transferred at the end of the third year. Typical of pupils in this category are the following:

Pupil 54 (boy—AA 75). This pupil did extremely well in his 'B' course, and in the sixth year passed the Leaving Certificate examinations in English (L), mathematics (H), science (H), engineering (H) and history (L). He was employed by an engineering firm.

Pupil 2152 (boy—AA 70). This pupil was reported on by his headmaster as a very good boy, quiet and hard working. He was transferred to an 'A' course at the end of the first year. In the fifth year he passed in English (H), history (L), geography (L), French (L) and art (H). Described by the Rector as an excellent boy, working hard both for himself and the school. He returned to school for the sixth year, his seventh in secondary education.

Not all pupils who are transferred make a success, and the chances of success are less if they have been only a short time in a 'B' course, as the following case illustrates:

Pupil 275 (boy—AA 75). This pupil was transferred to an 'A' course after six months in the 'B' course to which he was allocated. He found the 'A' course well beyond his capacity and left school as soon as he reached the statutory school leaving age to become an apprentice grocer. The Rector reported that this boy would have been better suited to his original 'B' course. 'He has not lived up to the promise shown in his first term.'

That character qualities are of great importance in achieving success in the secondary school is shown again and again in the study of case histories.

Pupil 452 (girl—AA 68). This pupil was transferred to an 'A' course after one year. Although finding the course difficult, the pupil worked extremely hard and, after five years in a high school, passed the Leaving Certificate in French (L), mathematics (L) and science (L). Determined to gain a group certificate, she returned to school for a seventh year. The Rector reported that she had worked conscientiously and benefited from school educationally and socially.

Pupils whose PHB recommendation is BBB appear to have a greater chance of success when transferred from a 'B' to an 'A' course than those with other PHB recommendations. One of the obvious reasons is that some of these pupils had an AA above the pass mark. Another reason, and perhaps a significant one, is that several of them transferred to an 'A' course at the end of three years, by which time it was apparent that they could tackle a high school course successfully.

Summary

Pupils with an AA below the pass mark have a chance of success in a high school course, albeit in many instances a slight one; for example, under Fife conditions a pupil with AA 65 has about a one in fifty chance of success. The educational arguments against admitting all pupils with AA 65 are strong. Too many pupils would find the course beyond their intellectual powers and, as a result, teachers would find their work difficult and unrewarding. None the less, secondary education should be so organised that all pupils who have even a slight chance of succeeding are given the opportunity of transferring to an academic course if they reach a standard of attainment in the secondary course to which they have been allocated well beyond the expectations of their primary school teachers.

The longer a pupil remains in a 'B' course, the more reliable is a recommendation of a transfer to an 'A' course. It is, therefore, necessary to ensure that the curriculum for the ablest pupils in 'B' courses should not differ too much from that of the least able pupils in the 'A' course in order that the transfer from 'B' to 'A' courses does not involve the pupil in a radical change of curriculum.

As has already been emphasised, two of the factors which make for success in the high school are the character of the pupil and the encouragement which he receives from his home. Unfortunately, both are difficult to assess at the primary stage of a pupil's education, which again underlines the necessity for making it possible for the exceptional pupil to transfer from a 'B' to an 'A' course.

TWO-LANGUAGE COURSES

A course which includes French and Latin for the first three years in a secondary school is generally regarded in Scotland as a course for the ablest pupils. As McClelland pointed out, too many pupils take this course and, after one or two years, change to the easier one which has only one foreign language. He recommended that only those pupils with an AA of 86 (1·435 σ above the mean) should be allowed to undertake a two-language course unless they have a special linguistic ability.

In Fife there was no regulation regarding the type of pupil to be admitted to a two-language course, each Rector being left to pursue his own policy: a variety of procedures has naturally resulted. In one case the Rector does everything possible to recruit all pupils with AA 85+ in the two-language course, tries to dissuade any pupil with AA 80– from taking this course, and makes no attempt to influence the choice of those in the AA range 80–85. In another the majority of the pupils are given a two-language course, but some of them are given a modified Latin course for the first year. Some of the Rectors consult the parents, while others allocate the pupils on the basis of AA. One school offered German as well as French for the modern language; all the others adhered to the traditional French/Latin combination.

Number of Pupils in Two-Language Courses

Six hundred pupils, approximately 49 per cent of the total number of pupils allocated to 'A' courses, were enrolled in a two-language course for the first year of their secondary course. Many of them found the course too difficult and were reallocated to courses which were less difficult. Table XXXVI gives the distribution of AAs of the pupils studying Latin in each of the first three years of the secondary course.

The large decrease in the number of pupils taking Latin at the end of the first year is due in the main to the policy in two of the schools where the majority of pupils were given a two-language course in their first year. These schools accounted for 104 of the 147 pupils who dropped Latin at the end of the first year.

TABLE XXXVI

DISTRIBUTION OF AAS OF PUPILS STUDYING LATIN IN EACH OF THE FIRST THREE YEARS

AA	*Year of Course*		
	I	II	III
100+	13	14	14
95–99	36	36	36
90–94	91	89	86
85–89	161	144	138
80–84	155	115	108
75–79	120	51	46
70–74	24	5	4
Total	600	454	432

Almost all the reallocations were from a two-language course to a one-language course. One pupil whose AA was 74 showed little enthusiasm for high school and was transferred to a 'B' course in another school. Another pupil, AA 85, was transferred to a one-language course at the end of the first year and to a 'B' course at the end of the second year; the rather pathetic note of explanation was 'difficult home, father and mother separated'. There was one case of promotion to a two-language course at the end of the first year, a pupil with AA 100 who had done exceptionally well in a one-language course during his first year but who originally had refused to undertake a two-language course.

Fifty-Fifty Chance of Success

The rating in Latin of each pupil at the end of the third year on an ABCDE scale allowed a success/fail decision to be made for each pupil: the ratings D and E were taken as denoting a failure. Those who were transferred to a one-language course were also regarded as failing. The distribution of the successes and failures is as follows:

AA	*Success*	*Fail*	*Success Ratio*
100+	13	—	100
95–99	32	4	89
90–94	64	27	70
85–89	99	62	62
80–84	65	90	42
75–79	23	97	19
70–74	2	22	8
Total	298	302	

Fifty per cent of the pupils who started out with Latin failed, confirming the McClelland conclusion that the educational wastage is too high, and that fewer pupils should take the two-language course.

The fifty-fifty chance of success is at AA 84·5, which is close to the McClelland figure of 86. It is clear, therefore, that pupils with AA less than 85 should not be encouraged to take Latin in their curriculum in the first year of high school.

Individual Case Histories

A study of case histories sometimes throws further light on allocation problems. What causes pupils of high ability to fail in Latin? For example:

Pupil 2487 (boy—AA 98). This pupil did not justify his high AA in the first three years of his secondary course, his success mark being 20 and his Latin mark 32 per cent. In the subsequent years of the course, his interest may have been aroused as he gained a Leaving Certificate with passes in English (H), history (L), French (L), mathematics (H) and science (H). The Rector's comment was that he emerged from comparative obscurity to be dux in mathematics; ability elsewhere rather limited. He was employed by the Electricity Board.

Pupil 698 (boy—AA 98). This boy did well in his first three years, having a success mark of 35 although failing in Latin, for which he was awarded a mark of D. In the fifth year he gained a certificate with 9 points but added only 1 point in his sixth year. His Rector reported that he was lazy and had too many outside interests. He matriculated at university with the intention of taking an honours degree in engineering.

It appears that the degree of interest aroused may account for success or failure in an essentially academic subject such as Latin. Boys with a strong bias towards mathematics and science, for example, sometimes find it difficult to take an interest in the subject unless it is well taught. The effect of interest is further illustrated in the following case:

Pupil 1606 (boy—AA 88). This boy did only moderately well in the first three years of the secondary course, having a success mark of 20 and failing in Latin with a mark of 35 per cent. In the fifth year, he gained a certificate with passes in English (H) and history (L). In the sixth year, however, there are recorded passes in Latin (H), Greek (H) and mathematics (L). The reason for the change is shown in the Rector's report—'Boy wishes to become a minister. Not a good examinee but had developed greater determination since making up his mind about his career.'

Success in Latin requires relatively high intellectual ability. There are always exceptions.

Pupil 191 (boy—AA 79). This pupil had a reasonably successful first three years, having a success mark of 21 but scoring 73 per cent in Latin. In his fifth year, he gained a certificate with English (H), history (H), Latin (H), Greek (L), mathematics (L) and music (L), and in his sixth year Greek (H). The Rector reported 'A very good type of boy. He may manage an honours degree in classics.'

Pupils with AAs below 80, unless in exceptional circumstances, may become discouraged and lose confidence if they are made to face a course which is beyond their powers. For example, a pupil with AA 77 who continued with Latin till the third year when he scored a mark of 7 per cent would have been better advised to have taken a one-language course in the first instance: many parents protest, however, when their children are not given Latin in the first year of an 'A' course.

The following case demonstrates how Latin may be a disadvantage to a pupil:

Pupil 600 (girl—AA 76). This girl started out in a two-language course and found Latin particularly difficult, scoring 10 per cent in the third year examinations. After dropping the subject, she began to gain more confidence and by the fifth year gained passes in mathematics (L), science (L) and art (H). By the sixth year she was able to pass the Leaving Certificate examinations in English (H), history (L), mathematics (H) and science (H). The Rector reported on her later years 'She worked hard and successfully. Has a very good appearance and social confidence.' She left school to become a laboratory assistant.

The above pupil might have had less trouble in her early years if she had been transferred to a less onerous course, as was done in the following case:

Pupil 295 (boy—AA 75). This boy found the first year in a two-language course too much for him and was transferred to a one-language course at the end of his first year. In the sixth year of the course, he gained a certificate in English (H), geography (H), French (L), mathematics (L) and art (L) and entered a training college to qualify as a teacher of physical education. The Rector reported that he was a fine athlete and a boy of attractive disposition.

There is little doubt that if he had not been reallocated to a one-language course, he would have probably lost confidence and had a less successful school career.

Conclusion

There is ample evidence for the conclusion that pupils with an AA of less than 85 should not be permitted, unless in exceptional circumstances, to study Latin in the first year of their secondary course. The loss of confidence in those pupils who study Latin but do not have the ability to make a success of it may result, as one Rector confirmed, not only in general failure but also in behaviour problems.

It may well be that the allocation of pupils in the first instance to courses which are beyond their intellectual ability results in the loss of not a few potential members of the pool of highly educated manpower.

ONE-LANGUAGE COURSES

There are several types of one-language courses. For boys the curriculum generally includes French and technical subjects, and for girls French and homecraft, or French and commercial subjects. In one of the schools German is offered as an alternative to French.

Number of Pupils in One-Language (French) Course

The number of pupils taking French in a one-language course was 377. Table XXXVII gives the distribution of AAs of the pupils studying French in each of the first three years of the one-language course.

TABLE XXXVII

DISTRIBUTION OF AAs OF PUPILS STUDYING FRENCH IN ONE-LANGUAGE COURSES

AA	*Year of Course*		
	I	II	III
100	1	—	—
95–99	1	1	1
90–94	6	6	6
85–89	28	28	28
80–84	110	109	106
75–79	171	170	163
70–74	57	56	55
65–69	4	4	4
Total	378	374	363

Only 15 pupils did not continue normally through the three years of the course. Three repeated a year because of lack of progress, 2 repeating the first year and 1 the second year; 11 were transferred to a 'B' course, and in 7 cases this involved a change of school; and 1, as was pointed out in the previous section, was reallocated to a two-language course.

Fifty-Fifty Chance of Success

Of the 378 who started in a one-language course, 195, i.e. more than 50 per cent, failed to gain the success rating of A, B or C at the end of the third year. The distribution of the successes and fails is on page 153, the pupil who transferred to a two-language course being regarded as a success:

The opposite data show the fifty-fifty chance of success to be AA 82, the same AA as gives a fifty-fifty chance of gaining a group SLC. With so many failing in French, there appears to be an argument for raising the pass mark above 75 in order to prevent educational wastage, if French as presently taught continues to be an integral part of high school courses.

AA	*Success*	*Fail*	*Success Ratio*
100+	1	—	100
95–99	1	—	100
90–94	6	—	100
85–89	20	8	71
80–84	58	52	53
75–79	69	102	40
70–74	24	33	42
65–69	4	—	100
Total	183	195	

As with all other aspects of secondary education which have been studied, some able pupils did not succeed and some pupils of relatively low ability succeeded. It will be noted that 8 pupils with AAs 85–89 failed in French, and 28 pupils with AAs below 75 have been rated as successful. Factors which bring unexpected success or failure are interest in school work, character qualities and encouragement from the home, none of which can be measured statistically. Interest is aroused by successful teaching, which emphasises the necessity for having in the secondary schools highly qualified and trained teachers. There is no way of estimating the educational wastage caused by inefficient teaching.

CHAPTER X

THE PASS MARK

THE term 'pass mark' in schemes for allocating pupils to secondary courses of instruction is not one of which the educationist can readily approve, because it conveys the idea of a single mark which a pupil must score in an examination or a series of examinations in order to gain admission to certain courses. Educational research has revealed the fallibility of examination marks too often for such a procedure to be allowed to pass unchallenged, although a child-like faith in 50 per cent as an examination pass mark is still held by many examiners. On the other hand, too many departures from normal terminology might lead to confusion and make comparison with other investigations difficult. The term is used in this inquiry theoretically as a single mark, but in practice as a combination of test results and teachers' estimates along with other considerations.

Reference in this chapter is made to the IQ level of pupils equivalent to their AA, because the concept of IQ is better known to the majority of teachers and comparison with the McClelland inquiry is made easier. It should be clearly kept in mind, however, that the score which determines a pupil's promotion is not limited to the IQ measure at the age of 11 years, and no claim is being made for this single measure.

THE MCCLELLAND PASS MARK

McClelland, whose data gave the correlation between the promotion battery and success as 0·8, suggested that the pass mark be 0·7 σ above the mean, which is approximately equivalent to an AA of 75 or an IQ of 110.

With a pass mark of 0·7 σ above the mean (AA 75 or IQ 110), the percentage of a complete age group which will be considered for promotion to high school courses will be 24·2. In other words, 242 pupils in every thousand will be allowed to proceed to senior secondary courses if they so desire. Not all such pupils opt for high school courses and a number of borderline cases below the pass mark will be admitted, but for ease of illustration it will be assumed that all the 242 proceed to high school courses.

Under the McClelland conditions a pupil with IQ 110 (AA 75) was reckoned to have an even chance of success, and it is possible to calculate the chances of success at each ability level. For example, a pupil with an IQ of 120 (AA 85) has a 79 to 21 chance of success, and a pupil with an IQ of 130 (AA 95) has a 96 to 4 chance of success. Similarly, it is possible to calculate the chance of success at each ability level below the pass mark. For example, a pupil with IQ 100 (AA 65) has an 18 to 82 chance of success. Table XXXVIII gives the chances of success at different ability levels above and below the pass mark.

TABLE XXXVIII

CHANCES OF SUCCESS AT DIFFERENT ABILITY LEVELS WITH THE McCLELLAND PASS MARK AND CORRELATION

IQ	AA	Chance of Success	Chance of Failure
135	100	98	2
130	95	96	4
125	90	91	9
120	85	79	21
115	80	66	34
110	75	50	50
105	70	30	70
100	65	18	82
95	60	9	91
90	55	4	96

These results are illustrated diagrammatically in Figure 12. The whole age group is shown in the normally distributed set of scores with the pass mark at IQ 110 (AA 75). The dark vertical lines at each IQ or AA level denote the probable number of pupils who will fail, and the broken line denotes the number of pupils who will probably succeed at that level. For example, the size of the two lines at IQ 110 is the same, and at IQ 120 (AA 85) the ratio of the length of the two lines is 21:79.

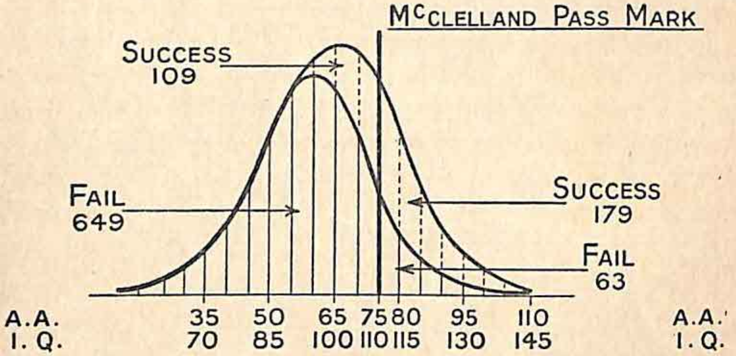

FIGURE 12 Success and Failure with the McClelland Pass Mark

The curve separating the dark and broken lines can be defined by a mathematical equation, but its determination at this place might be interpreted as a vulgar display of mathematical technique, and it is perhaps sufficient to give the equation in a footnote which can be ignored by the majority of readers.* This curve will be referred to as the success-failure curve or more simply as the S-F curve.

It is possible to calculate, also, the theoretical number of pupils who, having been admitted to high school courses, will probably fail and the number who will probably succeed. In addition, it must be remembered that in any scheme of selection there will be a number of pupils excluded from high school who would probably have succeeded, the reject-successes. These figures are as follows:

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* Equation of S–F curve $h(x) = \frac{1}{2\pi}\int_{d}^{\infty} e^{-\frac{1}{2}(u^2+x^2)}\,du$

where $d = \frac{\kappa - rx}{\sqrt{1-r^2}}$ and $y=\kappa$ is the line dividing success from failure.

	Success	*Fail*	*Total*
Admit	179	63	242
Reject	109	649	758
Total	288	712	1,000

Pupils who theoretically would have been admitted but who would probably fail (the admit-fails) and those who would have been rejected but who if admitted would succeed (reject-successes) were designated by McClelland as misfits.

From the above data it can be seen that the number of misfits is 172, admit-fails 63 and reject-successes 109.

McCLELLAND PASS MARK UNDER FIFE CONDITIONS

The McClelland pass mark, AA 75, was adopted in the Fife promotion scheme, but the fifty-fifty chance of success is at AA 82 and not 75 and r is 0·872 and not 0·8. It is obvious, therefore, that the probable number of successes and failures will differ from those estimated from the Dundee data. The corresponding figures under the Fife conditions are as follows:

	Success	*Fail*	*Total*
Admit	136	106	242
Reject	25	733	758
Total	161	839	1,000

Figure 13 illustrates the effect of the new results.

Two hundred and forty-two pupils are still admitted, but the number of those who will probably succeed falls from 179 to 136 and the number who will probably fail increases from 63 to 106. There is, however, a credit side to the balance sheet because the number of reject-successes has fallen from 109 to

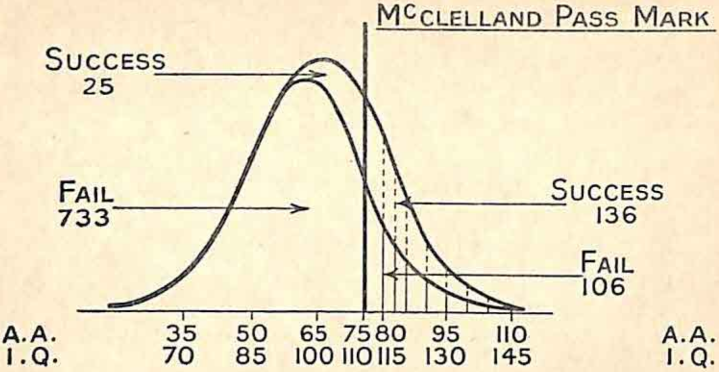

FIGURE 13 Success and Failure with the McClelland Pass Mark under Fife Conditions

25 and the number of reject-fails increased from 649 to 733. The total number of misfits (admit-fails+reject-successes) has fallen from 172 to 131.

Under Fife conditions the pupil at the McClelland pass mark of AA 75 has no longer a fifty-fifty chance of success: at this point the pupil now has a 22:78 or approximately 1:4 chance of success.

THE FIFE PASS MARK

If the McClelland philosophy is accepted and the pass mark is fixed at the level where the pupil has a fifty-fifty chance of gaining a group SLC, it will be, under Fife conditions, at AA 82 or IQ 117. With such a pass mark, 129 pupils in every 1,000 would be admitted to high school courses, of whom 97 would succeed; 64 pupils who would probably succeed would be rejected. The complete effect would be as follows:

	Success	*Fail*	*Total*
Admit	97	32	129
Reject	64	807	871
Total	161	839	1,000

The total number of misfits under such an arrangement would be 96.

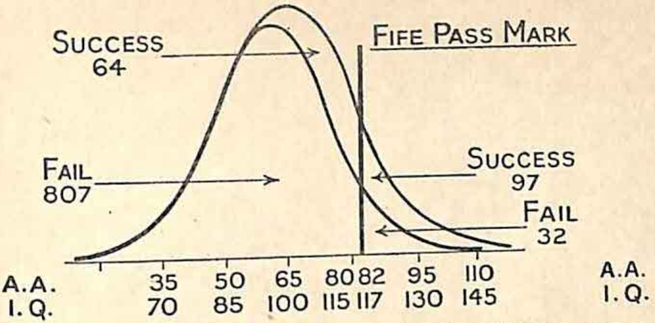

FIGURE 14 Success and Failure with the Fife Pass Mark

Figure 14 illustrates the effect of the Fife pass mark, that is, at AA 82 (IQ 117), where the pupil has an even chance or success, and when the correlation between the battery and success is 0·872.

FIXING THE PASS MARK

The pass mark is not entirely decided by the results of a scientifically conducted investigation but is also partly determined by philosophy. For example, McClelland suggested that the pass mark be fixed at a point where the pupil had a 50 per cent chance of succeeding, and stressed that he did this simply because at this point the number of mistakes or misfits (admit-fails and reject-successes) is a minimum. Some might have preferred to have been more generous by including pupils who had a 40 per cent or greater chance of succeeding, taking the view that a mistake of exclusion does more harm than one of inclusion. Others might have insisted on a more severe policy by admitting only those with at least a 60 per cent chance of succeeding, regarding the educational harm to the pupils who fail to be greater than that caused by excluding able pupils from high school courses.

The Fife investigation was carried out under greatly different conditions from those existing at the time of the McClelland inquiry, and the results were naturally different. For example, under the Fife conditions a pupil with AA 82 (IQ 117) has a 50 per cent chance of success. If the pass mark were fixed at

AA 82 where the number of misfits is a minimum, many more pupils would be excluded from high schools than at present when the McClelland pass mark is used. There may be an argument at the present time for admitting more who will fail in order to increase the number gaining the Scottish Leaving Certificate. The relative educational harm caused by admitting a pupil to a course in which he will fail as compared with that caused by excluding a pupil from a course in which he would have succeeded must be weighed in the balance.

The reader is invited to apply his own philosophy and decide where the pass mark should be fixed.

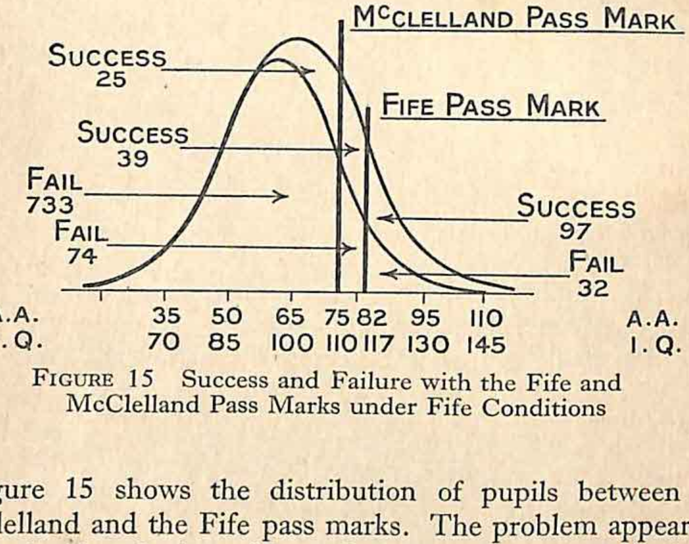

FIGURE 15 Success and Failure with the Fife and McClelland Pass Marks under Fife Conditions

Figure 15 shows the distribution of pupils between the McClelland and the Fife pass marks. The problem appears to be to decide whether either of these pass marks should be selected or whether some intermediate position would be preferable.

To place the pass mark below AA 75 under Fife conditions would not result in the inclusion of many more pupils with a reasonable hope of success. On the other hand, it would result in the inclusion of many more admit-fails.

The chances of success and failure at different levels between AA 75 and AA 82 under Fife conditions may be seen from Table XXXIX.

TABLE XXXIX

CHANCES OF SUCCESS BETWEEN AA 75 AND AA 82 UNDER FIFE CONDITIONS

AA	IQ	Chance of Success	Chance of Failure
75	110	22	78
76	111	24	76
77	112	28	72
78	113	32	68
79	114	36	64
80	115	41	59
81	116	46	54
82	117	50	50

One factor which must be kept in mind in deciding the pass mark is the present shortage of skilled manpower. Present-day conditions may justify the inclusion of more pupils who will fail in order to ensure that fewer pupils who will succeed will be excluded. On the other hand, it may be argued with equal justification that the teaching of large numbers of pupils lacking the ability and qualities necessary for success in high school may place an undue burden on teaching staffs already strained to the limit.

CHAPTER XI

THE POOL OF ABILITY

'IN the conditions of modern life the rule is absolute—the race which does not value trained intelligence is doomed.' It is only within recent times that the significance of A N Whitehead's dictum, written many years ago, has been fully appreciated as it has become increasingly evident that success in the struggles which are now taking place on the frontiers of knowledge can be achieved only by those nations which are prepared to develop and deploy the full potential of their intellectual resources. More and more the economic wellbeing of this country depends on its ability to convert to industrial purposes the discoveries of science; and, although there is a general acceptance of the need for increasing the pool of highly educated manpower, the conception of a limited pool of ability is obtaining tardy recognition.

In 1946, the Barlow Committee, while advocating that it was essential to double the number of scientists graduating from the universities, appeared to have little fear that the latent talent for this purpose was available, since they concluded, 'There is available in our population a large reserve of innate intelligence, and even allowing for other factors, there are more potential graduates than we could hope to take into our universities by any degree of expansion practicable within the next ten years.' Some five years later, however, the Departmental Committee on 'The Supply of Teachers in Scotland' revealed a less sanguine attitude. The opinion was expressed, 'The teacher supply problem is just part of the more general problem of limited manpower and womanpower, particularly of highly educated manpower and womanpower.'

Three reasons may be put forward for the increasing demand for highly educated manpower in a modern industrial society.

First, as the organisation of society becomes more complex and as industry and commerce develop new and more complicated techniques, the dependence on skill and ability grows: the raising of the school leaving age resulted in an increased demand for teachers, and industry, recognising the importance of labour relations, feels compelled to recruit university graduates for management. Secondly, developments in science and technology bring into being new professions: the greatly increased Civil Service has had to set up a scientific branch, and in the medical service radiography, physiotherapy and dietetics all demand their quota of educated manpower. Thirdly, the complexity of professional work has brought about the need for special training and the general raising of standards of admission. The Appleton Committee clearly indicated how the entrance qualifications to a large number of the professions had been raised in the last 20 or 30 years.

It is generally realised that there must be a greater number of young people with high educational qualifications leaving our schools and universities. To some the solution lies in financial incentives, but to others the root of the problem goes much deeper. Many of those in the latter category are doubtful whether the schools and the universities even when working under the most favourable conditions could produce in sufficient numbers the trained personnel to meet all the present and future demands. It is necessary therefore to enquire into the size of the pool of ability, the extent to which it can be channelled into the national reservoir of highly educated manpower, and how much of it will inevitably seep away before it reaches this goal. The problem of selection is, in fact, part of this wider problem, and the data in this investigation allow a contribution to be made towards its solution.

THE SIZE OF THE POOL

Before the scientist can begin to estimate the size of the pool of ability, the aid of the philosopher must once again be invoked. The first task is to define the level of attainment which must be reached by those who are to be included in the pool: this is a matter on which there is room for disagreement. The successful completion of a high school course has been regarded as the attainment of at least two higher and three lower passes in the Scottish Leaving Certificate examinations, and it is, therefore, an obvious measure of the criterion for inclusion in the pool of ability. It is, for example, the minimum qualification for admission to a Training College in Scotland, and has the further recommendation of being the criterion of success used by McClelland and thus allows a comparison to be made with his results.

SOURCES OF THE POOL

The pool has three main potential sources of supply:

(1) those who actually attain the group certificate;
(2) those who leave high school early but who, in the opinion of the Rectors, would have gained the certificate; and
(3) those who might have reached the necessary standard if they had enrolled in a high school course.

(1) *Number of Group Scottish Leaving Certificates*

In Chapter VIII it was shown that 276 pupils or 6·27 per cent of the promotion group gained a group leaving certificate.

(2) *Able Leavers*

(*a*) This group consists, in the first place, of the able leavers to whom reference was made in Chapter VII, and the numbers were as follows:

	Number of Pupils	*Percentage of Promotion Group*
Third year able leavers	82	1·86
Fourth year able leavers	62	1·40
Fifth year able leavers	1	·02
	145	3·28

(*b*) In the second place, there are those who sat the Leaving Certificate examinations but who left school at the end of their fifth year, failing to gain the group certificate and passing only in some subjects of their course. It was shown in Chapter VIII that of the 145 pupils who left at the end of the fifth year, 47 gained a group certificate. It was also shown that in the group who remained at school for a sixth year, there was approximately a 100 per cent increase in the number of group leaving certificates. It is fair to assume, therefore, that if the 145 pupils had returned to school for a sixth year, there would have been an additional 47 pupils or another 1·06 per cent of the promotion group who would have gained a group Scottish Leaving Certificate.

(3) *Outwith High Schools*

There are two categories of pupils who might have gained a group SLC if they had enrolled in a high school course—(*a*) those whose AA was above the pass mark; (*b*) those with an AA below the pass mark.

(*a*) Consideration was given to the 113 pupils in this category in Chapter IV where it was suggested that some of those pupils had the ability to gain a Leaving Certificate. It is difficult to estimate the number of such pupils, but in Chapter X it was shown that pupils with an AA of 75 have approximately 1:4 chance of success, and it is not unreasonable to assume, therefore, that of the 113 pupils, some 20 at least would probably have succeeded in a high school course. This would send another 0·45 per cent of the promotion group into the pool of ability.

(*b*) Table XXXI shows that some pupils whose AA is less than 75 do obtain Scottish Leaving Certificates. Table XV indicates that there were 153 pupils with AAs in the class interval 70–74 whose parents wished them to follow high school courses, and it may well be argued that some of these pupils might have persevered in a high school course and gained a Scottish Leaving Certificate.

On the other hand, the system of transfer from one secondary course to another without examination, gives these pupils an opportunity to justify their claims and, as is shown in Chapter IX, many of them actually do transfer. Those pupils who do not reach the pass mark but who have the ability and character, and whose parents are prepared to give them every encouragement, are given an opportunity of attempting a leaving certificate course, and it is unlikely that any appreciable number of pupils of this type are lost to the pool.

Summary

An estimate of the size of the pool, based on the actual performance of the pupils at school, may be made as follows:

	Percentage of Promotion Group
1. Attaining a SLC	6·27
2. Able leavers	
(*a*) during the course	3·28
(*b*) at leaving certificate stage	1·06
3. Not enrolling in high schools	·45
	11·06

It may, therefore, be concluded that under present conditions the size of the pool of ability is approximately 11 per cent of an age group.

There are two other sources which might increase the size of the pool but which have not been taken into account. First, there are those who sit the University Preliminary Examinations and pass in a sufficient number of subjects to bring their certificate up to the group SLC standard. Secondly, there are the pupils below the pass mark who leave the junior secondary school for a job in industry and by study in a further education centre ultimately gain a qualification which would entitle them to be included in the pool of ability. Both these groups are small in number but none the less important.

The pool, however, could be increased by an appreciable amount if some of the 'present conditions' could be altered.

For example, throughout this report stress has been laid on the importance of the home in determining success or failure in school, a factor which operates both at the primary and secondary stage. Many parents are indifferent to and take little interest in their children's education; as a consequence their scholastic attainments do not reflect their innate ability. Many potential additions to the pool of ability are lost, some even before they reach the critical age of 12.

Again, the criterion of admission to the pool was based on success in Leaving Certificate courses. It may well be that the very nature of these courses is responsible for the restriction in the estimated size of the pool of ability. For long, Scottish education has been dominated by university requirements, and it is still a valid criticism that in essence it is book-based. Many able children find this type of education unreal and with little apparent connection with the world they know outside the school walls; their interest is never aroused and their standard of attainment is consequently low.

The allocation of pupils to courses, too, may result in the unnecessary limitation of the estimated size of the pool of ability. As was shown, many able pupils are enrolled in two-language courses which they find to be beyond their intellectual resources, and as a result they lose confidence in themselves. When they leave school early they are not placed in the category of able leavers, not because of lack of ability but rather because they have been asked to clear a hurdle which was for them unreasonably high.

The restricted size of the pool may also be due to standards which are unnecessarily high. As was shown in Chapter VIII (Table XXXI), the lowering of the standard of the SLC by 1 point would have resulted in an increase in the number of SLCs by about 10 per cent. Some pupils find difficulty with a particular subject—the linguist with mathematics or the scientist with languages—and fail to gain the qualification by a slight margin. Their subsequent careers in Central Institutions often show that they might well have been included in the pool of ability, and it may therefore be necessary to review the criterion of success in high school courses.

Conditions in schools vary. It was shown, for example, that the child in the rural school ought to be given special consideration. As some 43 per cent of the schools in Scotland fall into the category of small schools, there may be a significant number of children who fail to be included in the pool because of the failure to give them special treatment.

The increasing demand for highly educated manpower has resulted in a shortage of suitably trained teachers. Highly intelligent pupils can be successfully taught the higher branches of a subject only by highly qualified teachers, yet in many schools in Scotland there is a grave shortage of suitably qualified staff, particularly in mathematics and science. Pupils will not reach the high standards of the Scottish Leaving Certificate if they are inefficiently taught, and there must be at the present time a number of able pupils who fail to gain a SLC because of uninspired and unsatisfactory teaching. Unless the teaching profession receives an adequate share of the pool of ability, there is a distinct danger that the pool will not only be limited to its estimated size but also that it will begin to contract because its very source will dry up—in the nation's schools.

Theoretical Calculation

Figure 13 in Chapter X illustrated how with the Fife data the S–F curve separates probable success and probable failure.

From this diagram it can be seen that with the pass mark AA 75 there are 136 pupils admitted and 25 pupils rejected, all of whom will probably succeed. These 161 pupils make up the pool of ability. On this basis, the size of the pool is approximately 16 per cent of an age group.

The two estimates are relatively close to each other, and it would normally be anticipated that the estimate on actual performance would be lower than that based on theoretical considerations. There are too many imponderable factors operating against accurate prediction of how pupils will fare, and these tend mainly to operate against success. The able child, for example, can be hindered in his quest for success by illness, family circumstances, or many other unpredictable factors, whereas the less able child exceeds expectations only in rare cases.

McClelland estimated that, as conditions were at the time of his investigation, 16·7 per cent of the total population would be successful in a senior secondary course, and that to raise the percentage above this would require far reaching improvements in social and environmental conditions, along with an increase in the variety and attractiveness of high school courses.

The conception of a limited pool of ability is in its early stages and may require considerable modification in the light of further research. There may be not one pool but two or three pools. The atomic scientist may have one kind of ability and the scientific technician another; one is not superior to the other—

simply different. Our education system has been, to a large extent, based on the idea that a high level of mental ability enables pupils in the secondary school to study successfully a wide range of subjects all at a reasonably high standard. This appears to be largely the case in the primary school, but may not hold for pupils after they have reached the age of 12 years. Linguistic, mathematical, scientific, musical and artistic abilities may not necessarily be closely related: some pupils may be musical but have little aptitude for mathematics or science. It is important both for the individual and for society that this whole question be closely investigated.

AFTER SCHOOL CAREERS

The shortage of highly educated manpower is affecting many aspects of national life. Education is suffering because of the lack of highly qualified and trained teachers, developments in atomic energy are being retarded because of the scarcity of mathematicians and scientists, industry is in urgent need of engineers; and there is scarcely a single form of employment recruiting skilled personnel in which demand does not exceed supply.

Nor is the problem confined to Britain. In USA, because of the success of the USSR in scientific achievement, there is a 'unique concern' with the adequacy of their resources of specialised technical and professional manpower. An attempt is being made to assess the position objectively by means of a Commission on Human Resources and Advanced Training, and a National Manpower Council has been set up. In Australia, also, there is growing recognition that progress in the national economy depends on raising educational standards and in reducing the wastage of the more talented students.*

It is important, therefore, to have some knowledge of the manner in which our manpower reserves are being deployed. The after school careers of the 444 pupils of the SLC group were ascertained by the Youth Employment Officers, and it was thus possible to determine the distribution of Leaving

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* 'Reducing Wastage among the Gifted' Department of Public Instructions, Queensland, *Bulletin* No 13, February, 1957.

Certificate attainments of the pupils entering each type of career.

The majority of the pupils either continued in some form of full-time education or entered employment, although a number returned to school for a seventh year. The armed forces claimed a few of the boys, and a number, indicating the present day mobility of population, left the country for places as widely scattered as Canada, USA, Africa, Malta and Hong Kong. Table XL gives the distribution according to attainment of the pupils in the various types of career.

Full-Time Courses in Further Education

Forty-eight per cent of the SLC group followed some form of full-time further education, in universities, training colleges or technical colleges (mainly central institutions), and the distribution is shown in Table XLI.

It will be noticed that 2 pupils with less than 8 points entered a university course: these gained passes in the university preliminary examinations in the subjects in which they had failed in the Leaving Certificate examinations.

Universities

The universities attracted 122 pupils, i e 28 per cent of the SLC group or 2·8 per cent of the promotion group. It is interesting to compare the number of pupils who actually matriculated at a university with the numbers who attained the qualifications to do so. Table XLII gives the comparative figures.

From Table XLII it will be seen that 122 out of 173, i e 71 per cent of those who gained a university entrance qualification, chose to matriculate at a university.

The shortage of professional manpower makes it evident that 2·8 per cent of an age group is not sufficient to provide for the number of recruits required by the professions if they are to meet all the demands now being made upon them. One of the main problems facing the country is how to increase this number. Could, for example, some of the 29 per cent who qualified but did not choose a university career have been persuaded to do so?

TABLE XL

Careers and Leaving Certificate Attainment

Points	*Leaving Certificate Attainment* 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Total	% SLC Group
Full Time Education		1			1	6	10	24	42	35	41	26	15	11	1	213	48
Employment	2	8	10	17	22	22	29	26	20	8	8	5		1		178	40
Returned to School			1	3	6	5	6	9	4	2	2					38	9
Armed Forces			1				1	1	1		1					5	1
Left County				2	4	3		1								10	2
Total	2	9	12	22	33	36	46	61	67	45	52	31	15	12	1	444	100

TABLE XLI

SLC GROUP FOR FULL-TIME COURSES OF FURTHER EDUCATION

Establishment	*Leaving Certificate Attainment*														Total	% SLC Group
	1	2	3	4	5	6	7	8	9	10	11	12	13	14		
University						1	1	15	21	33	25	14	11	1	122	57
Training College					3	3	14	16	9	3		1			49	23
Technical Colleges	1			1	3	6	9	11	5	5	1				42	20
Total	1			1	6	10	24	42	35	41	26	15	11	1	213	100

TABLE XLII

UNIVERSITY QUALIFIERS AND ENTRANTS

Number of Pupils	Leaving Certificate Attainment							Total
	8 or less	9	10	11	12	13	14	
Qualifying	32	32	50	31	15	12	1	173
Entering	17	21	33	25	14	11	1	122
Percentage	53	66	66	81	93	92	100	71

A study of the careers of the Leaving Certificate group shows that a proportion of pupils with a UEG enrol either in a training college or in a technical college and, therefore, find their way into professional occupations. Other careers which attract highly educated young people are accountancy, civil service, and the chemical laboratories of industrial engineering firms: and few would deny that these occupations also require their share of highly educated manpower. Success in persuading the 29 per cent of pupils qualified for university education but whose interests appear to lie elsewhere to follow a university course would merely shift the problem to another part of the field.

Training Colleges

The teaching profession recruited through direct entry to training colleges 11 per cent of the SLC group. This number would ultimately be increased by graduates from the universities and by others from the technical colleges with specialist qualifications in subjects such as art, handwork, domestic science, physical education and music. It is interesting to note that those who entered the training colleges from school are drawn from the band of 5 to 12 points and include 14 pupils who have a UEG certificate. There is evidence to support the view that there is an increasing tendency for girls to prefer the shorter approach into the teaching profession through the training college rather than by the way of university, a choice which ultimately must affect the supply of teachers qualified for teaching in secondary schools.

Technical Colleges

The technical colleges recruited 42 pupils from a slightly wider band of attainment, which might have been anticipated since they cater for a wide field of specialised abilities such as art and music. Nine pupils who entered the technical colleges had a UEG certificate.

The courses chosen by the 42 pupils were as follows:

Agriculture	3
Art	12
Chemistry	1
Commercial	3
Homecraft	6
Engineering	7
Hotel	2
Music	1
Nautical	1
Pharmacy	6

The 9 pupils with a UEG certificate were following careers in agriculture (2), pharmacy (5) and engineering (2).

The pupil with 1 point (English L) was in an agricultural course, the boy with 4 points (English L, geography L, mathematics L and science L) came from a fishing area and was following a nautical course, while the boy with 11 points, a minister's son, was following an agricultural course. It is evident that the technical colleges offer satisfactory courses for able boys whose interest is largely in non-literary channels; the pupil with AA 92 and passes in mathematics (H), science (H) and history (L) after five years at school would no doubt find to his liking the engineering course on which he entered. That 5 of the 6 pupils in a pharmacy course should have a UEG certificate might be regarded as surprising and controversial.

Returned to School

That many parents are anxious for their children to remain at school, in order to add to the value of their certificates, is evident from the fact that 38 pupils returned to school for a seventh year. Not all such pupils were borderline cases. Some had missed a year because of illness or domestic circumstances such as parents having to take their children abroad. There is the sad case of the pupil (AA 88) who did not gain a SLC because he had spent too much time working as an errand boy.

Some pupils acquired an interest late in school life and made up their minds, despite having to continue at school for an extra year, to pursue this new-found interest at university or college. Others returned for a seventh year because they found it difficult to pass in a subject in which they had little interest but which was necessary for university or professional entrance regulations; the scientist who struggles with a language and the linguist who cannot solve the mysteries of mathematics are not uncommon.

Employment

Certain types of employment attracted a fair proportion of the SLC group; these are shown in Table XLIII.

Girls appear to have a more limited range of careers from which to choose than boys; clerical or secretarial work and nursing between them recruited about 12 per cent of the SLC group. Many of the girls who failed to gain a SLC chose clerical work, hoping to obtain a secretarial post, and, as has already been shown, a large proportion of the able leavers found their way into clerical occupations. Nursing has long had an attraction for girls, and as the recognised course of training does not start until they become eighteen, many of them remain at school to the Leaving Certificate stage. The university course for nurses, which has recently been established, is also influencing girls to remain at school in order to gain their Scottish Leaving Certificate. Banking is drawing a few girls into its service as able boys seem now to refuse to consider banking as a career, although such girls do not generally possess a group certificate.

The civil service still attracts a number of able pupils, and surveying is specially popular in a developing area such as Fife, where there is a large constructional building programme and the mining industry recruits annually a number of surveyors. Other employments which recruited a proportion of high school pupils are architecture—6, journalism—6, draughtsmanship—4, and a whole range of employment such as librarianship,

TABLE XLIII

Leaving Certificate Attainment and Various Employments

Employment	*Leaving Certificate Attainment*															Total
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Clerical		2	5	2	5	6	7	1	6	1						35
Nursing		1		4	1	4	5	4				1				20
Civil Service		1		1	1	1	1	1	2	2	3	1				14
Surveying			1	4	1	2	2	3		1						14
Accountancy				1	1	1	1	3	3		2	1				13
Laboratory Assistants			1		1	1		2	4	1						10
Engineering					1	2	2	1	1	2	1					10
Chemistry							3	4		1	1					9
Banking	1			1	3	2		1								8

pharmacy, and planning, which recruit annually 1 or 2 pupils from the SLC group.

Pupils who complete a five or six years' course at a high school have open to them a wide variety of employment. Several, because of their parents' businesses, undertake what appear to be unlikely jobs. The boy who became a lorry driver no doubt was learning the business from the bottom of the ladder; the girl who became a trainee cook would probably hold a post of responsibility later in life; and the lad with a certificate of 6 points who became an apprentice plumber will add to what is popularly regarded as a diminishing band—the intelligent plumbers.

He would be rash indeed who would be willing to say for which of these careers a high school education was not beneficial or who would be prepared to deny any of them their share of highly educated manpower. What is clear is that the size of the SLC group is not large enough to meet all the demands now being made upon it: all the professions which have been mentioned are short of suitably qualified recruits.

Mathematics and Science

Most modern industrialised societies depend to an increasing extent on the achievements, originality and skill of the mathematician and the scientist; their economy is sustained by the work of the technologist whose basic training also depends on mathematics and science. It is important, therefore, that from the pool of ability there should be drawn a large percentage of individuals who attain a high standard of achievement in mathematics and science.

Several questions naturally arise. What proportion of the pool at the present time specialises in mathematics and science? What proportion of the pool can become specialists in mathematics and science? Is the ability to do mathematics and science a specialised ability?

The easiest question to answer, though perhaps the least important, is that regarding the proportion of the pool which actually achieves a high standard of attainment in mathematics and science. Translated into the terms of this investigation, this question becomes—what proportion of the SLC group attain a pass in higher mathematics and in higher science in the Leaving Certificate examinations? Table XLIV shows the number of boys and of girls gaining a pass in higher mathematics but not in science, and in science but not in mathematics, the number who passed in both subjects, total number who gained a pass in mathematics, and the total number who gained a pass in science.

TABLE XLIV

NUMBER OF PUPILS PASSING IN HIGHER MATHEMATICS AND SCIENCE IN THE LEAVING CERTIFICATE

	Promotion Group		Maths only		Science only		Maths and Science		Total Maths		Total Science	
	B	G	B	G	B	G	B	G	B	G	B	G
Number of Pupils	227	217	26	29	21	17	96	27	122	56	117	44
Total	444		55		38		123		178		161	
Percentage	100		12·4		8·6		27·7		40·3		36·3	

It is of interest to note that 178 pupils or 40·3 per cent of the SLC group successfully sat the examination in higher mathematics, whereas 161 or 36·3 per cent were successful in higher science.

One reason for the greater number of passes in mathematics is the bookish tradition of Scottish education: Leaving Certificate mathematics is still a paper and pencil subject. Another reason is that in the high schools there are many more courses which include mathematics without science than courses which include science without mathematics. In one of the large high schools in Fife, where there are thirteen courses available for fourth year pupils, mathematics was a subject in twelve of these courses. Only in one is science given without mathematics; the science in this instance is biology (botany and zoology) and is studied only by a small number of pupils. A pass in higher mathematics, also, is demanded by many of the semi-professions as an essential qualification for admission and hence has a career significance which science does not yet possess.

Another striking feature of Table XLIV is the difference between the number of boys and the number of girls passing in higher mathematics and in higher science. In mathematics the ratio is approximately 2:1, and in science almost 3:1 in favour of the boys. Many reasons have been adduced for the small proportion of girls taking mathematics and science. Traditionally, the realm of mathematics and science has been regarded as the preserve of the male sex, and some even suggest that by nature girls are not so practically minded as boys, although their excellence in homecraft seems to belie this theory. Again, it is known that at the present time there are fewer careers in science for girls than for boys, although the example of Russia seems to indicate that girls are not constitutionally inferior to boys in this respect. There appear to be good grounds, therefore, for the belief that there is in this country a deep untapped reservoir of scientific ability amongst girls in high schools and, once the opportunity for employment in scientific fields is open to girls, it may well result in a considerable increase in the total number of pupils taking mathematics and science at school.

27·7 per cent of the group completed the course with passes in both higher mathematics and higher science, and it is from this group that the bulk of the scientists and technologists will probably be drawn. Clearly, the proportion of pupils leaving school with this qualification must be increased and the prospects that this can be achieved would appear to be reasonably bright. There seems little reason, for example, to suppose that a proportion of the 12·4 per cent in the 'mathematics only' group could not qualify in higher science as well.

The following figures indicate another possible source from which an increase in the numbers of mathematicians and scientists might come. They show the increase in the number of passes in mathematics and science in the group of 255 pupils who sat the examinations both in the fifth and sixth years.

	Mathematics and Science			*Total Mathematics*			*Total Science*		
	B	G	T	B	G	T	B	G	T
Fifth year	54	15	69	64	33	97	64	19	83
Sixth year	82	23	105	100	49	149	94	32	126

In each group there is an increase of about 50 per cent in the number of passes. Clearly, some of the 145 pupils who leave school at the end of the fifth year and who do not gain a pass in mathematics or science might have done so if they had remained at school for a sixth year.

Not all who gain a pass in higher mathematics or higher science are necessarily capable of following a career in which these subjects play an essential part. For example, many of them pass at the second attempt; 50 in mathematics and 35 in science fall into this category. It may be deduced, therefore, that 128 pupils in mathematics and 126 in science, i.e. just over 25 per cent of the SLC group, may be capable of specialising in these subjects at a higher level. As many of the pupils will be taking mathematics and science as subsidiary subjects, the number who will continue their study of them will be well under 25 per cent of the SLC group. This is obviously too small for present-day needs and steps will have to be taken to increase the proportion of pupils specialising in these subjects.

What type of pupil passes in higher science and higher mathematics? Some indication of this is given in Table XLV, which shows the distribution of AAs of pupils passing in these subjects on the first occasion.

The mean AA of pupils passing in higher mathematics is 89·2, whereas the mean AA of those passing in higher science is 85·7. It would appear, therefore, that the mathematicians are drawn from a sample of abler pupils. The mean AA of the total SLC group is 85·4.

A study of individual cases provides some interesting details. Examples from the group whose AAs are relatively low and yet who pass in mathematics or science tend to indicate a special ability for these subjects.

Pupil 1402 (boy—AA 72). When transferred from a B1 course he was described by his teacher as one of the best pupils in mathematics and science but mediocre in other subjects. His certificate was made up of passes in higher mathematics and science and a pass in lower history.

Pupil 1622 (boy—AA 73). When admitted to an 'A' course on an appeal he was described as good at mathematics and science but had

TABLE XLV

Distribution of AAs of Pupils Passing in Mathematics and Science on the First Occasion

AA	Mathematics			Science		
	B	G	T	B	G	T
105 +	—	2	2	—	1	1
100–104	4	5	9	4	2	6
95–99	11	10	21	11	5	16
90–94	14	11	25	15	7	22
85–89	22	7	29	22	7	29
80–84	16	1	17	14	3	17
75–79	11	1	12	12	1	13
70–74	2	—	2	3	1	4
65–69	—	—	—	1	—	1
60—	—	—	—	—	—	—
Incoming	8	3	11	11	6	17
Total	88	40	128	93	33	126

to work hard to pass in other subjects: a hard worker with limited ability. His final certificate had 8 points and he intended going to university.

Pupil 395 (boy—AA 70). When transferred from a 'B' course he was described as 'an exceedingly hard worker and receives every encouragement from home.' Having been retarded for one year, he gained in the sixth year English (L), geography (L), science (H), mathematics (L), technical subjects (L). He returned to school for a seventh year.

Some pupils, therefore, of apparently relatively low ability find mathematics and science much easier than other subjects in the curriculum.

At the other end of the scale, there are very able pupils who find mathematics and science beyond their ability.

Pupil 1064 (boy—AA 91). Described as a good boy who was awarded a prize for service to the school. A prefect, he is good at both work and games. A certificate of 11 points was taking him to the university, his passes being English (H), history (H), German (H), Latin (H), Greek (H), but he could pass in mathematics (L) only with difficulty.

Pupil 772 (boy—AA 94). Described as good at work and games, had a certificate of 10 points with English (H), French (H), Latin (H), mathematics (H), but simply could not pass in science.

Pupil 604 (girl—AA 92). Described as a girl of high ability and good character. She had higher passes in English, French, German, Latin and history, but could not gain a pass in mathematics.

It would appear that there is at least some evidence for the belief that ability to succeed in mathematics and science, particularly mathematics, requires some special mental ability. The data here presented in no way make a case for this argument, but they do suggest a line for future research on a problem which is now of considerable importance.

CHAPTER XII

BRIEF SUMMARY AND MAIN CONCLUSIONS

The Inquiry

THE primary purpose of the inquiry was to test the validity of a promotion scheme based on the recommendations in McClelland's classical investigation *Selection for Secondary Education*. To achieve this, the complete secondary school histories of 4,416 pupils were studied.

The Fife investigation was conducted under conditions which differed considerably from those existing at the time of the McClelland inquiry. The Scottish Leaving Certificate had changed from a group to an individual subject certificate, the Education (Scotland) Act of 1946 had established a free system of secondary education, and the economic and social climate had greatly changed since 1935 when the inquiry in Dundee was started. The Fife investigation also profited by the experience of the Dundee experiment. It was possible to follow the children throughout the whole of their school careers, whereas the McClelland investigation had to be concluded after the pupils had completed three years of their secondary education, and thus actual Leaving Certificate results were compared with the primary school data, whereas McClelland had to be content with the headteachers' estimates at the end of the third year. The Education Authority areas in which the two inquiries were conducted differed in several respects. In Fife, secondary education had been free for many years; the schools varied from one-teacher rural schools to large urban schools, and Fife pupils and teachers were acquainted with objective testing as an essential part of promotion schemes; intelligence tests, for example, had been used in allocating pupils to secondary courses of instruction from 1922. Any comparison of the results of the two inquiries must take these factors into account.

Promotion Battery

The promotion battery in this investigation was $IQ_1+IQ_2+Qe+Qa+Tes+Tas$, which differed in some respects from that used by McClelland. For example, two intelligence tests were used, whereas the results of one test only were available to McClelland. Again, the objective tests in English and arithmetic were more closely allied to McClelland's qualifying examination than the Moray House objective tests, and were developed over several years by research groups of teachers. The teachers' estimates in English and arithmetic, also, were scaled by techniques which had been devised specially for promotion schemes. The Fife battery, therefore, could be regarded as a finer measuring instrument than that used in the Dundee investigation.

Predictive Value of the Battery

The coefficient of correlation between the battery and success was 0·872, where success was measured by a pupil's attainment in the Scottish Leaving Certificate examinations after five or six years in a high school. For the individual subjects, English, French, Latin, mathematics and science, passed on the higher grade after five or six years, the correlations were 0·87, 0·88, 0·89, 0·84 and 0·80 respectively. From these results it can be concluded that the battery is a good predictor of a high school pupil's success both in the individual subjects and in the certificate as a whole.

The correlation between the battery and success in the junior secondary school is not quite so high, being of the order of 0·7 (uncorrected for range). There is some evidence, also, that the battery tends to predict with greater efficiency success in courses which are predominantly literary in character.

Of the individual measures of the battery, those of English were the best predictors of success in high school courses, the scaled teachers' estimate in this subject being the most efficient individual measure over the six years of the course. On the other hand, the measures of English were the least efficient predictors of success in the junior secondary school. For success in the junior secondary school, the measures of arithmetic were the most effective individual predictors, although they were the least effective for the high school courses. The measures of English, therefore, appear to be more effective in predicting success in courses which are predominantly literary or academic in character, whereas the measures of arithmetic are more efficient when the course has a practical bias.

The two sections of the English test, interpretation and langauge usage, both make significant contributions to the efficiency of the English test as a predictor of success in secondary education. On the other hand, it would appear that the mechanical section of the arithmetic test is a relatively poor predictor of success in secondary education. Future research is needed on the methods of assessment of mechanical arithmetic and, also, of the methods of teaching arithmetic in the primary school. Since research has shown that there is a significant loss of learning in mechanical arithmetic not long after the pupils leave the primary school, it might well be that the teaching at this stage has emphasised efficiency in mechanical operations at the expense of an understanding of the more fundamental concepts of number, quantity and space.

The individual measures of the battery all make a contribution to its predictive efficiency.

The Home

Examinations are not the be all and end all of secondary education, but they provide the only measureable factors by which a pupil's success or failure can be judged. Throughout the inquiry there is abundant evidence that the influence of the home can be decisive in determining whether a pupil will succeed or fail in the internal or external examinations which every pupil has to face in the secondary school. The influence of a good home, and for that matter a bad one, cannot be measured statistically; none the less there is a strong argument for taking it into account when allocating pupils to secondary courses. Encouragement to study is by no means in direct proportion to the economic status of the parents.

There is evidence that fewer parents now deny their children the opportunity of following high school courses, although a large number of them give their children no encouragement to complete the courses upon which they enter. On the other hand, there are many parents who are deeply disturbed and disappointed when they learn that their children are not considered to have the necessary mental ability to profit from high school courses: no matter how favourable the home influence may be, it cannot counterbalance the lack of ability.

Wastage

Many able pupils who could gain a Leaving Certificate leave school before completing the course. Reports from the schools showed that 1·86 per cent of the promotion group who probably would have gained a Leaving Certificate left during the third year and 1·4 per cent during the fourth year.

There are twice as many girls as boys among the able leavers, which indicates that the attitude is still prevalent among some parents that higher education is wasted on girls.

Among the factors which cause able pupils to leave school early are adverse home conditions, defective character qualities and physical defects. Lack of interest in the type of education provided in secondary schools and the attractions of employment and evening leisure also draw many able pupils from the schools; to counteract these forces, a reconsideration of secondary education as it exists, particularly in high schools, is urgently required.

Not all the able pupils who leave school early can be classified as wastage. Some continue their studies in further education centres and ultimately acquire qualifications equivalent to and even higher than the Leaving Certificate. A bridge between the day schools and the local technical colleges would close a gap in the education system, the existence of which results in the talents of many children remaining undeveloped.

Causes of Failure in High School Courses

Twenty-eight per cent of the promotion group were allocated to high school courses, and after six years 6·27 per cent of the group had gained the group Leaving Certificate and another 3·83 per cent sat the examinations but failed to gain the group certificate. It is important to discover the reasons why only some 10 per cent of the promotion group reached the Leaving Certificate stage. Many simply did not have the mental ability and, as has already been pointed out, the influence of the home and the character qualities of the pupils accounted for the lack of success of some who appeared to have the necessary mental ability to profit from high school courses.

Reasons for failure, however, may lie not only in the children and their homes but also in the schools. Too many pupils, for example, were allocated to two-language courses, and as pupils with AA 85 (IQ 121) had only a 50 per cent chance of success in Latin, there was a 50 per cent failure in this subject by the end of the third year. The very structure of the courses now available also requires investigation; there may be pupils who could make a success of courses in which a foreign language is not essential, since some pupils who can reach a high standard in mathematics and science find languages difficult or uninteresting. It would appear, too, that transference from one course to another is difficult with the present organisation of high school education, and pupils continue in courses which are beyond their ability with the result that they lose confidence in themselves and interest in school generally.

One further cause of failure may lie in the very criterion which has been used to judge success or failure—the examination system. Despite the great volume of research on examinations, many teachers and external examiners do not yet fully appreciate the unreliability of their marks.

Selection

The organisation of secondary education is perhaps the most difficult problem in education at the present time. The choice between providing all forms of secondary education in one school or in two or more schools is an exercise in social and educational philosophy, and no attempt has been made in this investigation to suggest an answer to the problem. What the results do show is the degree of accuracy with which pupils can be allocated to secondary courses of instruction. No matter how secondary education is organised, the original allocation should never be irrevocable.

There is a tendency at the present time to allocate too many pupils to courses which are beyond their intellectual ability, and the traditional courses, such as two-language (French and Latin) and one-language (French), still predominate. The literary and book-based character of much of secondary education will have to be changed if it is to meet the needs of an age dominated by science, if it is to arouse the interest and quicken the imagination of modern youth, and if it is to nourish the latent talents of those individuals for whom language courses have little appeal.

The Pass Mark

The results of this investigation showed that a pupil with AA 82 (1·133 σ above the mean) had a 50 per cent chance of success and that the correlation between the battery and success was 0·872, while the corresponding figures from the McClelland inquiry are AA 75 (0·7 σ above the mean) and a correlation of 0·80. Some 24·2 per cent of an age group are admitted to high school courses by the McClelland pass mark, whereas a pass mark determined by similar principles on the Fife data would admit 12·9 per cent of an age group.

Several reasons can be advanced for the considerable disparity between the two results. The different conditions under which the two inquiries were conducted have already been referred to, and of these the most important in this connection is the fact that McClelland was forced to use estimates of success in the fifth and sixth years framed at the end of the third year of the course: such estimates are generally generous and over-optimistic. The different social and economic climate at the times of the inquiries is also marked, and may be indicated by the number of pupils above the pass mark opting for high school courses—44 per cent in Dundee as against 91 per cent in Fife.

There are other explanations which can be put forward but for which there is no objective proof. For example, there are some who hold that the present standard of the Leaving Certificate examinations is higher than in 1938. Again, the present shortage of highly qualified and trained teachers is bound to have some effect on lessening the chances of a pupil being successful in the Leaving Certificate examinations.

A difficult decision has to be made in fixing the pass mark in the light of the results of this investigation. There are sound reasons for adhering to the McClelland pass mark for, although by so doing many more pupils will be admitted to high school courses who will ultimately fail, the national interest will be served by the greater number of pupils who will gain the Leaving Certificate.

The Pool of Ability

The shortage of highly educated manpower is a social phenomenon of fairly recent origin. There is a striking contrast between the dearth of employment for university graduates at the time when the McClelland inquiry was initiated and the scarcity of recruits for almost every profession at the present time. The rapidly advancing fields of knowledge and the growing complexity of modern industrial societies have increased the need for the services of men and women with high educational qualifications, given rise to new professions, and raised the standard of admission to the established professions to such an extent that the schools and universities can no longer meet all the demands being made upon them.

The problem cannot be solved merely by persuading more pupils to remain for a longer period at school because all men are not created equal in intellectual ability. Some are in possession of rich natural endowments, a less fortunate few are so inadequately equipped that their grasp on the tools of learning will always remain insecure, and the majority have intellectual capacities which are distributed at levels somewhere between these two extremes.

There is only a proportion of any age group of pupils capable of attaining a group Leaving Certificate, and it is of the utmost importance that some estimate of this proportion should be established. 6·27 per cent of the Fife promotion group actually gained the certificate, and by a careful study of the educational careers of the other pupils in the group, it was estimated that some 11 per cent was the maximum number which could be expected to attain such a standard. McClelland's estimate was 16 per cent, a figure which was also found by a purely theoretical calculation from the Fife data. It may be assumed, therefore, that under present conditions the maximum size of the pool of highly educated manpower will lie between 11 per cent and 16 per cent of the population. These estimates of the size of the pool of ability have validity only under present conditions, with the existing courses and examination standards, and taking the criterion for admission to the pool as the ability to obtain a group Leaving Certificate: new calculations will be necessary if there is any fundamental change in any of these conditions.

Certain questions immediately arise. The first, and one which is receiving attention, is what steps must be taken to increase the number of pupils remaining at school and taking the Leaving Certificate? Another, which presents the other side of the coin, is what is the size of the pool which is required to meet the needs of our present day society? If it is established that the needs of society cannot be satisfied by the maximum output of the schools, there will have to be further consideration given both to the nature of the education provided in the schools and to the present distribution of highly educated manpower in society today.

The results of this investigation have raised many more problems than they have solved. What started out as an inquiry into the allocation of pupils to secondary courses of instruction finished as an inquiry into the characteristics of mental ability, the nature of secondary education, and the use to which it is put in a modern society dominated by scientific achievement. If this publication provokes or inspires further thinking and research on these important problems, the heavy labour involved in its production will have been well worth while.

APPENDIX I

ORGANISATION OF THE FIFE LOCAL RESEARCH GROUP

THERE are five panels or groups, each with distinct functions. Membership of one panel does not exclude a teacher from becoming a member of another.

Panel I

This group consists of experienced headteachers with an interest in research, teachers with special qualifications, such as a degree in education, and the administrative staff. A training in statistics was given to the members of the group during the first series of meetings. The group's chief function is to consider aims and methods of the investigations to be undertaken, make calculations, and discuss results. The maximum number on this panel is twenty.

Panel II

The need for this panel arose when the volume of calculation in the present investigation became too heavy for Panel I. This group meets on one evening per week to prepare for and work out statistical results, the implications of which are also discussed. This panel, consisting of about a dozen teachers, under the guidance of the administrative staff, calculated most of the correlation coefficients.

Panel III

This large volunteer group, who were affectionately referred to on occasions as 'the robots', undertake clerical work such as completing profile cards, and the sorting of data such as the preparation of frequency distributions and correlation grids. Statistical results are discussed and suggestions for further research often arise.

The English Panel

This group, created for the specific purpose of constructing English tests, has become expert in the measurement of English attainment.

The Arithmetic Panel

This group has functions corresponding to the English Panel, but deals with arithmetic.

PANEL MEMBERS

The following lists include present and former members:

Panel I

S Anderson, MA
J V Bayne, MA
D Blue, MA, EdB
S L Christie, BSc
H Fairlie, MA, BEd
E H Gibson, BSc
A Inglis, BSc
J S Macpherson, MA, BSc, EdB
J M Manson, MA, BSc
G T McIntyre, BSc
W Reid, MA
C Robertson, BSc, BEd
J R Rollo, MA
J Rule, MA
J A Smith, MA, BEd
T Sneddon, MA
D A Thomson, MA, BSc
J S Whyte, MA
D J Withrington, MA, BEd
R Wood, MA

Panel II

Miss J A Anderson, MA, EdB
A Arnot, MA
Andrew Beattie, BSc
Norman F Clark, MA
H G Henderson, BSc
R M C Huntley, BA, BEd
J S Macpherson, MA, BSc, EdB
T R Marshall, BSc
R Mitchell, BSc, EdB
C Robertson, BSc, BEd
R J Shaw, MA
E B Wilson, MA, BEd
R Wilson, BSc
D J Withrington, MA, BEd

PANEL III

The number of teachers who have assisted with the work of this panel is between 100 and 200. On any one evening the number present depends upon the task in hand and varies from 20 to 80.

ENGLISH PANEL

J R Rollo, MA (Convener)
J V Bayne, MA
Miss M D Bruce, MA
J Carmichael, MA
Miss J R Ramsay
J Rule, MA
R Wood, MA

ARITHMETIC PANEL

S L Christie, BSc (Convener)
E H Gibson, BSc
J M Manson, MA, BSc
G T McIntyre, BSc
W Reid, MA
C Robertson, BSc, BEd
T Sneddon, MA
D A Thomson, MA, BSc
J S Whyte, MA

In addition to the work of the panels, investigations were undertaken by individual or small groups of teachers who were given access to the data of the inquiry. Each project was designed as part of the complete pattern of the research, and wherever possible the results of these investigations have been included in the report. The names of the teachers and the topics with which they were concerned are listed below.

Correlation between Battery and Success in the Junior Secondary School (Chapter III)

John W Gregson, BSc
George T McIntyre, BSc
W F Paxton, MA, EdB
David H Scott, BSc
R J Shaw, MA

Pupils of 'A' Calibre in the Course of their Choice (*Chapter IV*)
Norman F Clark, MA

Urban and Rural Schools (*Chapter V*)
E H Gibson, BSc
C Robertson, BSc, BEd

Analysis of Test Battery (*Chapter VI*)
D J Withrington, MA, BEd

Predictive Value of Composition in the Junior Secondary School (*Chapter VI*)
J R Rollo, MA

APPENDIX II

ADMINISTRATION OF THE INVESTIGATION

1. *Compiling the Profile Cards*

In the normal working of the promotion scheme, specially designed schedules are used to record the promotion data of each pupil. These are completed in triplicate in order that one can be retained by the primary school, one sent to the secondary school to which the pupils are allocated, and one retained in the Education Office. The transfer of the data from these schedules to the profile cards was carried out by Panel III. Every entry was checked, as errors can easily be made when data are transferred from one form to another.

2. *Register of Profile Cards*

Each profile card was given a number, and a register was made to ensure that each card could be readily traced. Against each number were recorded the date of issue to and the date of return from the secondary school which was responsible for entering the examination marks. The date of the pupil's leaving school was also recorded, and thus it could be seen at a glance whether a card was 'live' (pupil still at school) or 'dead' (pupil's complete secondary school progress recorded).

3. *Classification of Profile Cards*

One of the advantages of a card system is that cards can be readily sorted. If, however, there are no distinguishing features by which each classification can be readily identified, the sorting of cards is a laborious process.

A most effective system of markers was by using Kalamazoo* coloured signals. Small coloured discs were attached to the edge of each of the cards and this made them easily distinguishable when in a filing cabinet. The cards for pupils studying French had a red disc, those for B2 pupils had a dark blue one, and those for B1 pupils, the largest group, were left unmarked. Further distinguishing markers could be easily added; for example, the cards of pupils studying Latin as well as French had a yellow disc alongside the red one. By the use of several coloured markers, the profile cards could be readily sorted into their appropriate groups.

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* Kalamazoo Ltd, 30 York Place, Edinburgh, 1.

4. *Punched Cards*

A difficulty which is encountered in an investigation in which the data are being compiled over a period is that there are times when calculations cannot be made because the cards are not available; they may, for instance, have been issued to schools in order to ingather additional information. This can be overcome by having a duplicate set of cards, and in this investigation the duplicate set consisted of specially devised 'punched cards'* on which most of the data was recorded in such a way that they could be automatically sorted. The burden of arranging data for calculations and for classification would have been very much heavier without the punched cards.

5. *Checking Calculations*

Even with the use of calculating machines, a large number of calculations had still to be done by the Panels. Errors were inevitable and, therefore, every calculation had to be checked. Each calculation was done independently by two teachers and the results were checked by a third: in this way accuracy was ensured.

* Paramount punched cards are published by The Copeland Chatterson Co, Ltd, 50 Wellington Street, Glasgow.

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EDUCATIONAL GUIDANCE
AND THE
POOL OF ABILITY

At the present time two of the social and educational problems which are constantly causing public concern are the organisation of secondary education and the shortage of skilled manpower. This book, which is a survey of the complete secondary school careers of 4,416 pupils, sheds further light on both of these problems.

Secondary education is organised in a manner largely determined by educational and social philosophy but, whatever its ultimate pattern, pupils must be allocated to courses of instruction suited to their age, ability and aptitude. In this book a comparison has been made between the records of a complete age-group of pupils at the end of their primary school and their progress throughout their secondary school careers, thus demonstrating the degree of accuracy with which allocation can be made.

Furthermore, it has been apparent in recent years that in modern industrialised societies there is a shortage of highly-educated manpower; if that manpower is to be used to the best possible advantage, it is essential that an estimate of the size of the nation's "pool of ability" be known. Dr McIntosh's book gives an account of an attempt to estimate the size of the pool of ability by scientifically-conducted research.